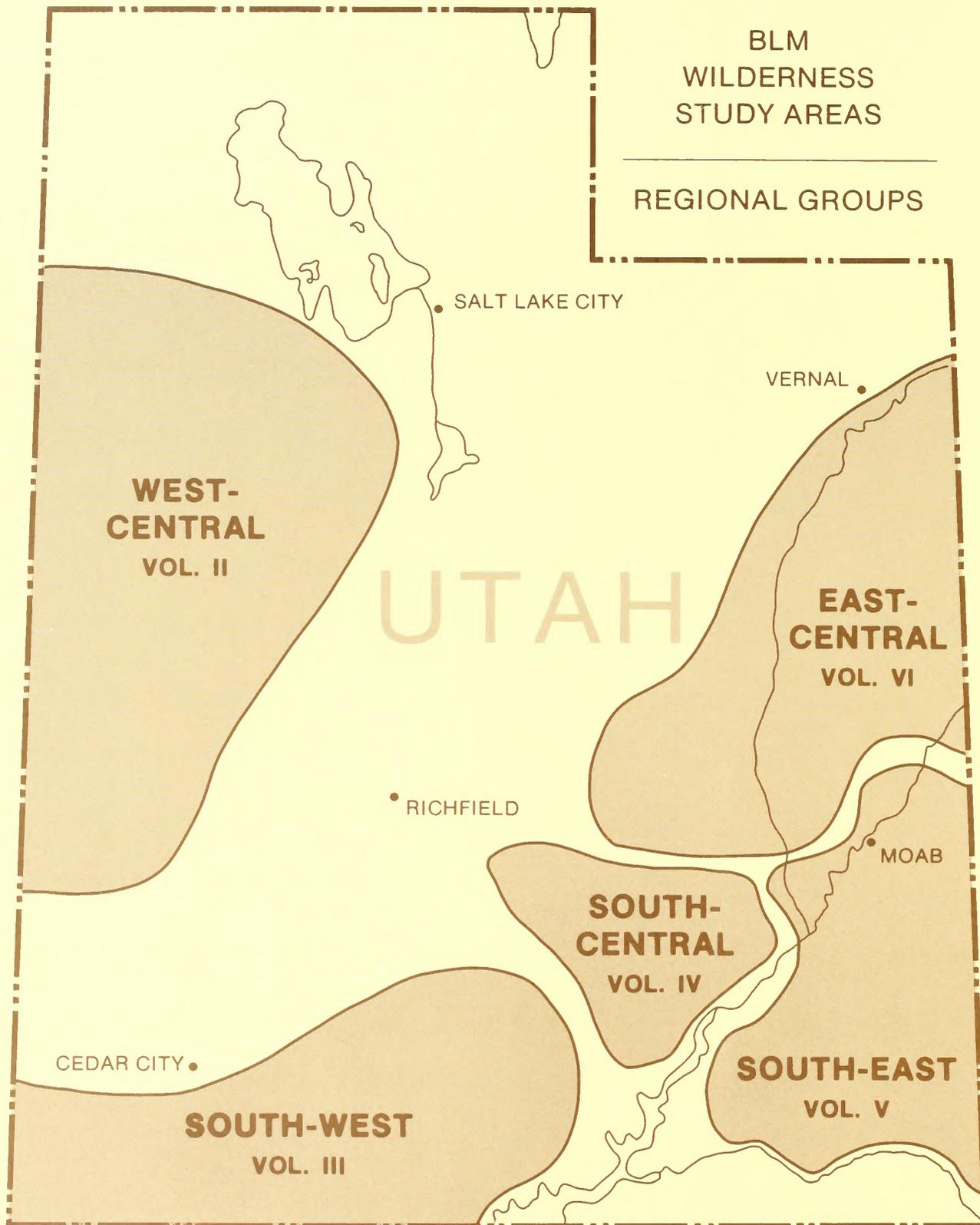


Utah BLM Statewide
Wilderness Draft
Environmental Impact
Statement

Volume VI
East-
Central
Region





This is **Volume VI** of a six volume set. Volume I is the statewide overview. It contains the Glossary and Appendices for all volumes. Volumes II-VI contain analyses for individual Wilderness Study Areas.

#13139481

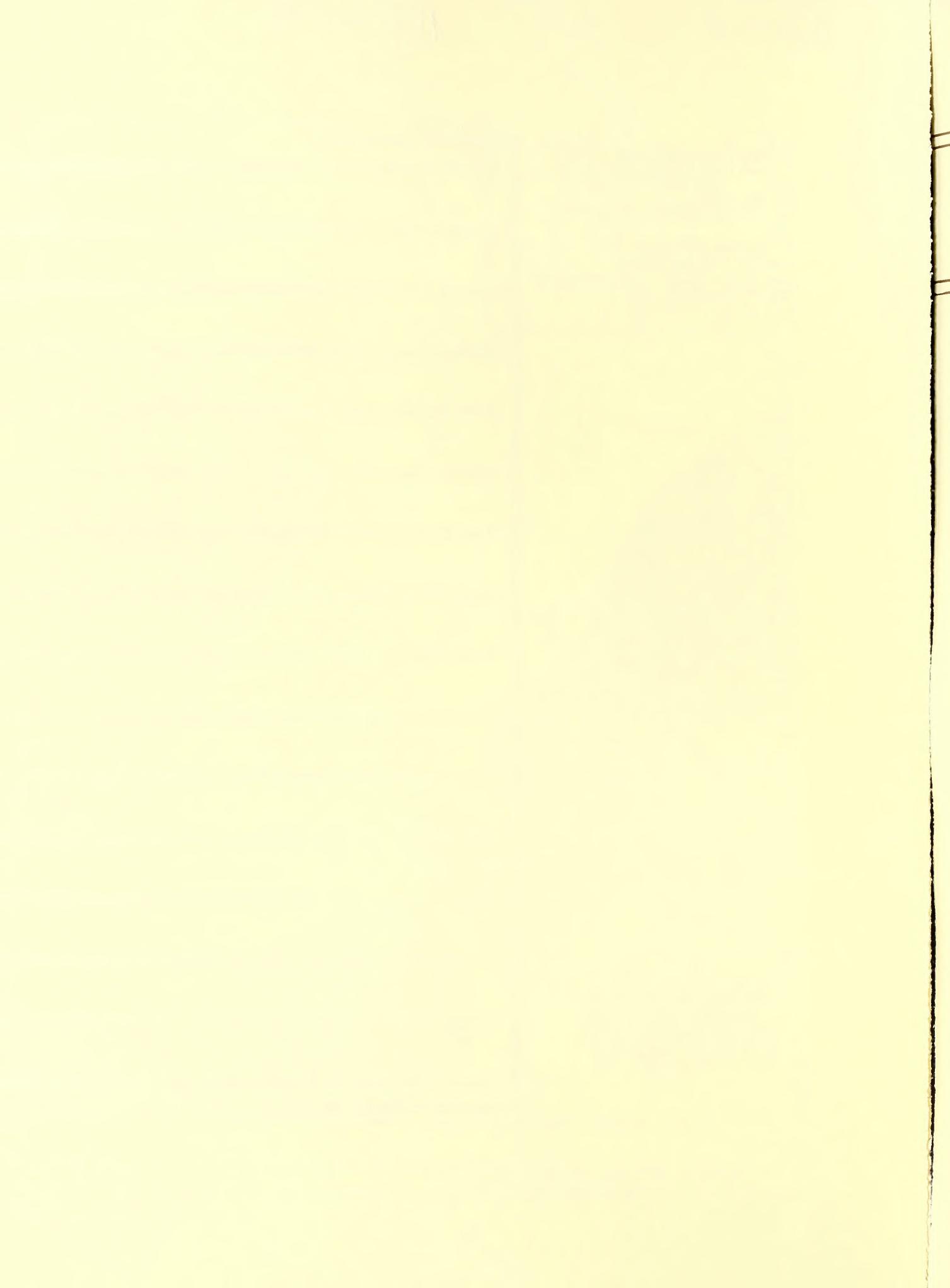
1088065432

WH
76.5
.08
US2
1985
v.6

Volume VI East- Central Region

San Rafael Reef WSA	
Crack Canyon WSA	
Muddy Creek WSA	
Devils Canyon WSA	
Sid's Mountain WSA	
Mexican Mountain WSA	
Jack Canyon WSA	
Desolation Canyon WSA	
Turtle Canyon WSA	
Floy Canyon WSA	
Coal Canyon WSA	
Spruce Canyon WSA	
Flume Canyon WSA	
Westwater Canyon WSA	
Winter Ridge WSA	
Daniels Canyon WSA	

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047



San Rafael Reef WSA



SAN RAFAEL REEF WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative (Proposed Action)	4
Summary of Environmental Consequences	7
AFFECTED ENVIRONMENT	7
Air Quality	7
Geology	7
Soils	9
Vegetation	9
Water Resources	11
Mineral and Energy Resources	11
Wildlife	14
Forest Resources	15
Livestock and Wild Horses/Burros	15
Visual Resources	15
Cultural Resources	16
Recreation	16
Wilderness Values	17
Land Use Plans and Controls	19
Socioeconomics	19
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	21
Analysis Assumptions and Guidelines for All Alternatives	21
No Action Alternative	21
All Wilderness Alternative (Proposed Action)	24
BIBLIOGRAPHY	29

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

SAN RAFAEL REEF WSA

(UT-060-029A)

INTRODUCTION

General Description of the Area

The San Rafael Reef Wilderness Study Area (WSA) is in the San Rafael Swell region of Emery County, Utah. It contains approximately 55,540 acres of BLM-administered land. An additional 3,630 acres of public land adjacent to the east side of the WSA is considered as a variation for potential wilderness designation. This variation would increase the size of the WSA to 59,170 acres.

The WSA is about 22 miles northeast to south and between 6 to 8 miles east to west. It is situated between the Temple Mountain/Goblin Valley road and Interstate 70 (I-70). The nearest communities are Green River (18 air miles) and Hanksville (20 air miles). The San Rafael Reef WSA is the easternmost of three WSAs that form an irregular half-circle on the southern part of the San Rafael Swell. The Crack Canyon WSA is within about 1 mile to the west from the southern end of the San Rafael Reef WSA. Located about 2 miles north from the San Rafael Reef WSA is the Mexican Mountain WSA in the northern part of the San Rafael Swell.

The topography of the San Rafael Reef WSA is dominated by checkerboard sandstone mesas, incised canyon drainages, and vertical fins and domes of the San Rafael Reef. Elevations range from 4,800 feet along the base of the Reef to 6,600 feet in the upper reaches of the central and northern areas.

The checkerboard sandstone mesas are located in the central and northern portions of the WSA. These lands are rich in colors of gold, rust, tans, and yellows. The checkerboarding effect comes from the faulted and cracked character of the Coconino Sandstone and Kaibab Limestone.

At least eight drainages cut the WSA's highlands as they carve their way east through the San Rafael Reef. These drainages are typified by deep, narrow sandstone walls and canyons averaging in depth from 200 to 1,000 feet. Some of these canyons have acute pour-offs, deep pools or catchments, and narrow twisting bottoms.

In addition to the massive character of the WSA's canyons and drainages, the San Rafael Reef is a very dominant and unique topographic feature. Near vertical fins jut from the desert floor along the northeastern boundary, forming a sawtooth ridge of sandstone. Pinyon-juniper and grassland are the dominant vegetation types in the WSA.

Average annual precipitation is 10 to 13 inches which mostly occurs in the form of rain. Temperatures range from 10 to 105 degrees Fahrenheit (F). An average of 8 inches of snow falls between October and April.

Specific Issues Identified in Scoping

Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in analyses for individual WSAs. General issues pertaining to the WSAs in the San Rafael Resource Area are discussed in Volume I. Issues and concerns specific to the San Rafael Reef WSA raised in the public scoping process (USDI, BLM, 1984b) are responded to below:

1. *Comment:* Wilderness designation would protect the San Rafael River, which is a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic Rivers System.

Response: The San Rafael River does not flow in or adjacent to the San Rafael Reef WSA. It does, however, flow through the Sids Mountain and Mexican Mountain WSAs, and a discussion of its potential for study and addition to the National Wild and Scenic Rivers System is included in the analyses for those WSAs.

2. *Comment:* The occurrence of the sensitive plant species *Hymenoxys depressa* in or near this WSA should be considered in the decisionmaking process.

Response: The discussion of the sensitive plant species *Hymenoxys depressa*, along with seven other candidate, proposed or listed plant species, can be found in the Affected Environment, Vegetation section, and potential effects are analyzed for each alternative. Because of mitigation required under existing law, regulation, and BLM policy, sensitive plant species would generally be protected from disturbance and loss.



3. *Comment:* Does the area have oil and gas potential?

Response: The oil and gas potential of the WSA has been determined to be low based on data from Science Applications, Inc. (SAI, 1982) and BLM. A discussion on the WSA's potential for oil and gas can be found in the Affected Environment, Mineral and Energy Resources section. The WSA has a potential for less than 10 million gallons of oil and 60 billion cubic feet of natural gas, only about one-third of which would likely be recoverable. As discussed in the Mineral and Energy Resources analysis, the opportunity to develop oil and gas resources would be lost with wilderness designation.

4. *Comment:* The oil and gas potential of the WSA is ranked low by SAI (1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be moderate to high. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (59,170 acres). The All Wilderness Alternative includes 3,630 acres on the east end of the WSA that have been added for consideration since the 1980 *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980) decision. This variation would improve manageability by following on-the-ground features, which

would aid in boundary identification. Except for mineral and energy resources, the variation would not result in any appreciable differences in environmental impacts. The following analysis is equally applicable to both the original and modified boundaries of the WSA. For simplicity in presentation, only the 59,170-acre figure is used in the following discussion. Differences are noted, however, in the section on Mineral and Energy Resources. A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

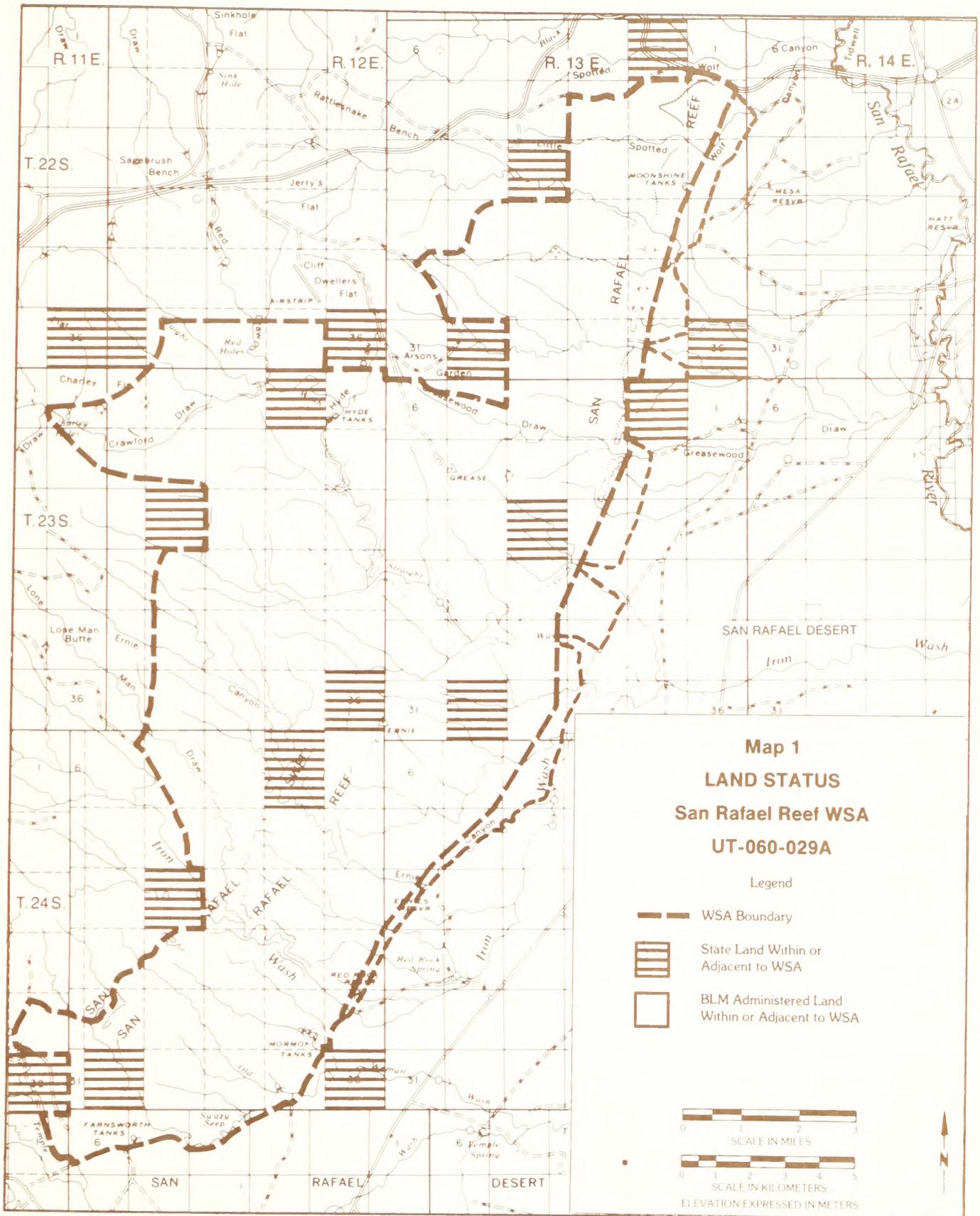
NO ACTION ALTERNATIVE

Under this alternative, none of the 59,170-acre San Rafael Reef WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the San Rafael Resource Area Management Framework Plan (MFP) (USDI, BLM, 1979a). The six sections of State land (4,029.36 acres) within the WSA (refer to Map 1) have not been identified in the MFP for Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership.

The following are specific actions that would take place under this alternative:

- Nearly all of the 59,170 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on the existing 1,006 mining claims (11,942 acres) and potential future mining claims subject to validity determination. These are primarily uranium claims. The original 55,540-acre WSA contained 751 existing mining claims covering 9,690 acres. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Thirty-one existing oil and gas leases (about 42,250 acres) and potential future leases could be developed under Category 1 (standard stipulations) on about 33,140 acres and Category 3 (no surface occupancy) on about 24,750 acres. Oil and gas leasing in Category 4 would not be allowed on 1,280 acres of the WSA. The 55,540-acre WSA has 31 leases covering 38,620 acres.
- The present domestic livestock grazing use of the 59,170 acres would continue on five allotments as authorized in the MFP

SAN RAFAEL REEF WSA



SAN RAFAEL REEF WSA

(1,344 Animal Unit Months [AUMs]). The existing two stock reservoirs could be used and maintained, and new range developments (none are now proposed) could be implemented without wilderness considerations. Use would continue by a small herd of wild burros (7 to 10 animals) that live in and near the WSA.

- Developments for wildlife (including potential reintroduction of natural species), watershed, and other resources would be allowed without consideration of the wilderness resource if in conformance with the San Rafael Resource Area MFP and future BLM planning documents. Reintroduction of bighorn sheep would be allowed to augment present populations, if proposed by the Utah Division of Wildlife Resources (UWDR).
- The entire 59,170 acres would be open to off-road vehicle (ORV) use. Established routes through canyon drainages and along old mining roads could be traversed by vehicles (primarily motorcycles and ORVs). The approximately 10 miles of ways and trails inside the WSA and approximately 10 miles of road that border the WSA would remain available for vehicular use. New access roads could be planned in the future.
- The approximately 45,010 acres of sparse pinyon-juniper woodland would continue to be closed to harvest of firewood and fenceposts as directed in the MFP.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II (26,350 acres), Class III (2,880 acres), and Class IV (29,940 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to

prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

- The entire area could be evaluated in a future BLM planning amendment for special management as an Outstanding Natural Area (ONA) or an Area of Critical Environmental Concern (ACEC). Such further planning is independent of the wilderness review and, as a separate action, is not analyzed in this document.

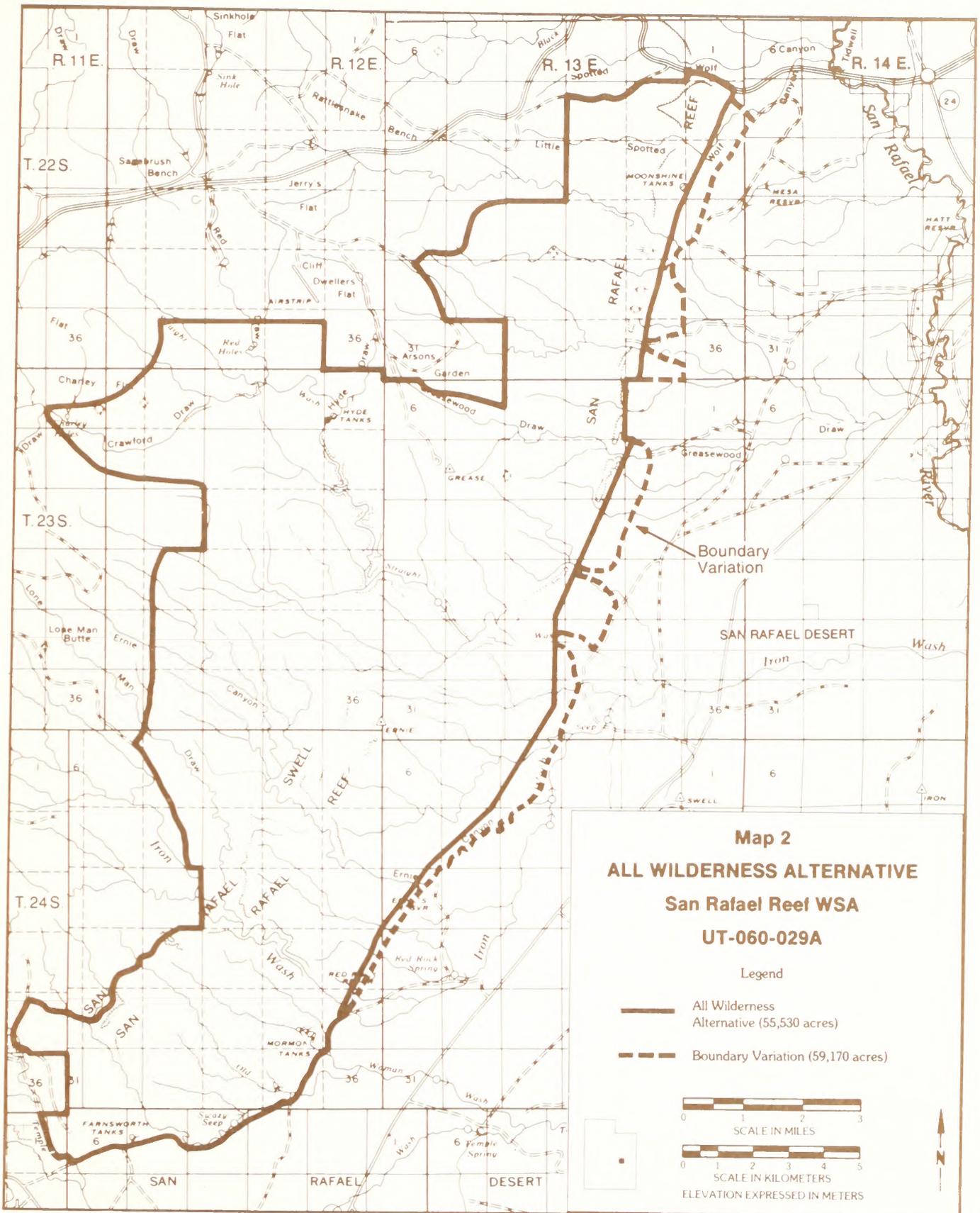
ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 59,170 acres of the San Rafael Reef WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, acquisition of six sections of State land (approximately 4,029.36 acres) within the WSA and three sections (1,920 acres) adjacent to the WSA (refer to Map 1) is likely as requested by the State, and would be authorized by purchase or exchange. (Refer to Volume I for further information on State in-holdings.) The other seven State sections outside of but adjacent to the WSA (as shown on Map 1) likely would not be acquired. Should land transfers be made, it is assumed that management and types of impacts to former State holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative within the foreseeable future:

- All 59,170 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the 11,942 acres of 1,006 existing mining claims that may be valid. (The 55,540-acre area would involve 9,690 acres for 751 existing mining claims.) Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration for wilderness values. Thirty-one existing oil and gas leases involving 42,250 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. (The 55,540-acre area would involve 31 existing leases and 38,620 acres.)

SAN RAFAEL REEF WSA



SAN RAFAEL REEF WSA

- Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael Resource Area MFP. The 1,344 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of range developments existing at the time of designation (in this case, two stock reservoirs) could continue in the same manner as in the past based on practical necessity and reasonableness. It is assumed that, after designation, the construction of new range developments (none are currently planned) would be allowed if determined necessary for the purposes of resource protection (range and/or wilderness) and the effective management of these resources, if consistent with wilderness protection standards (refer to Appendix 1).
- New water resource facilities or watershed activities (not related to rangeland or wildlife management) would be allowed after designation only if compatible with wilderness values, needed to correct imminent hazards to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). None are currently planned.
- Wildlife transplants and habitat developments would be allowed after designation if compatible with wilderness values. None are planned, but it is assumed that the potential reintroduction of desert bighorn sheep to increase existing populations would be allowed.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means.
- The entire 59,170-acre area would be closed to ORV use except for users with valid existing rights, if approved by BLM in accordance with 43 CFR provisions, or for occasional and short-term vehicular access if approved by BLM for maintenance of approved rangeland development or water facilities. About 10 miles of existing vehicular ways and trails would not be available for vehicular use except as indicated above. This closure would affect 10 miles of ways including a 4-mile way south of Old Woman Wash, a 2-mile way south of Arson's Garden, and various trails in Iron Wash, Ernie's Canyon, Straight Wash and in the drainage north of Temple Wash and Farnsworth Tanks. About 10 miles (or 15 percent) of the WSA boundary follow one short segment of I-70 and existing gravel roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 59,170-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Visual resources on 59,170 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 59,170-acre area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken would be those having the least impact to wilderness values. Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the 59,170-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be

SAN RAFAEL REEF WSA

used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the San Rafael Resource Area Unit Resource Analysis and MFP (USDI, BLM, 1979a) and other BLM technical reports and documents.

Air Quality

The WSA is a Prevention of Significant Deterioration (PSD) Class II area and currently meets Class II air quality classification as per the 1977 Clean Air Act Amendments. The nearest Class I area is Capitol Reef National Park, located approximately 23 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and the Green River-Moab area. Large point sources include powerplants in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, I-70, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles.

Geology

The San Rafael Reef WSA lies along the eastern flank of the San Rafael Swell. During the Eocene Epoch, the area began to be uplifted, creating a bulge in the existing sedimentary formations. A period of nondeposition and erosion began, carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, which resulted from the uplifting, is a breached, doubly plunging anticline that forms a prominent north-trending uplift on the Colorado Plateau.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations outcropping in the WSA range from the Jurassic Curtis to the Pennsylvanian Hermosa. The formations dip from 20 to 80 degrees to the east-southeast. The more resistant and steeply dipping formations form hogbacks, or monoclines, known as the San Rafael Reef. Elevations range from 4,800 feet along the base of the Reef to 6,600 feet in the upper reaches of the central and northern areas. A brief description of the exposed formations in the WSA follows, listed in order from oldest to youngest.

The Hermosa Formation, found in the central part of the WSA, consists of limestone with sandstone, shale, and evaporites. The formation contains the Paradox Member (an evaporite series) that thickens to the east.

Also found in the central part of the WSA is the Coconino Sandstone. This formation consists of white to buff, fine-grained, cross-bedded, massive, eolian sandstone with limestone occurring at the base.

The Kaibab Limestone is a light gray to brown, sandy, cherty limestone. This formation is found in relation to the Coconino Sandstone within the WSA. It contains many chert nodules with quartz and calcite crystals.

The Moenkopi Formation is also found in the central part of the WSA. It is composed of cross-bedded, medium-grained sandstone with lenses of conglomerate and variegated shale. Silicified and carbonized wood are common along what is considered the Reef's backside in the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and intertongue. The formation is a uranium producer and is composed of four members: Temple Mountain, Monitor Butte, Mossback, and Church Rock.

The Wingate Formation lines the cliff faces of the Reef's backside. It consists of buff, orange, and brown, massive cross-bedded, medium-grained sandstone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of

SAN RAFAEL REEF WSA

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
SAN RAFAEL REEF WSA

Resource	Alternatives	
	No Action	All Wilderness (59,170 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 3 million barrels of oil from tar sand, 1 million tons of potash, 500 tons of uranium oxide, 100,000 tons of manganese, and 50,000 tons of copper.	Oil, gas, tar sand and potash likely would not be recovered. Assuming a worst-case analysis, the recovery of locatable minerals would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	Less than 1 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Up to 68 percent of the bighorn sheep population, about 30 animals, could be displaced; however, this is not considered to be probable.	Wildlife would benefit from solitude.
Livestock	Grazing of 1,344 AUMs and maintenance of two reservoirs would continue. New developments could be allowed; however, none are now proposed.	Grazing of 1,344 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. If proposed, new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 340 acres.	Visual quality could be impaired on up to 140 acres.
Recreation	ORV use would continue on 10 miles of ways at current levels. Overall recreational use could increase from the present 650 visitor days per year to 969 over the next 20 years. Up to 340 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 10 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 340 acres (0.6 percent of the WSA).	Wilderness values would be protected, except on up to 140 acres (less than 0.5 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , State of Utah plans and policies, and the current BLM San Rafael MFP.	This alternative would conflict with the <i>Emery County Zoning Plan</i> . It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM San Rafael MFP.
Socio-economics	Annual local sales of less than \$129,545 and Federal revenues of up to \$128,632 would continue. An additional \$46,920 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$129,545 and Federal revenues of up to \$1,882 could continue, but Federal revenues of up to \$173,465 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, but increased recreational use over the next 20 years might result in local benefits of up to \$22,771 per year.

SAN RAFAEL REEF WSA

limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls.

The Carmel Formation forms the eastern base of the WSA. It consists of brown to gray, sandy limestone, red, thin-bedded sandstone and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

The northeastern boundary of the WSA is made up of a small portion of the Entrada Sandstone and Curtis Formation. The Entrada consists of red-brown, massive sandstone in its upper part and thin-bedded sandstone and red shale in the lower part. The Curtis Formation consists of red-brown to green-gray, thick-bedded sandstone and green-gray conglomerate.

Soils

The WSA contains four general soil mapping units differentiated by rock fins, canyon floors, hogbacks, and the lower portion of the Reef. Although wind may be an erosive agent, especially on the sandy soils at the base of the San Rafael Reef, water is the primary agent of erosion in the WSA. Vegetation offers a fairly good ground cover, except on the Reef where the exposed bedrock resists erosion. Precipitation is light, but it tends to occur in short, intense summer thundershowers that can dislodge and transport a great deal of soil. Refer to Table 2 for a summary

of erosion condition and to Table 3 for soil characteristics and land types.

TABLE 3
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	34	20,091	0.0	0
Shallow loamy soils on moderately steep cuestas	40	23,636	1.0	10
Deep stony soils on steep canyonsides	10	5,909	1.0	10
Deep loam soils on gently sloping structural benches	16	9,534	0.1	1
Totals	100	59,170		

Source: Hansen, 1985.

Vegetation

Table 4 summarizes existing vegetation types. The dominant vegetation types in the WSA are pinyon-juniper woodland and grasslands. Shrubs and barren types make up the remainder of the WSA. The barren type consists of areas where

Table 2
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	0
High	10.0	0	0	0	50	29,545	295,450
Medium	5.0	0	0	0	0	0	0
Low	1.0	50	29,545	29,545	16	9,534	9,534
Very Low	0.1	16	9,534	953	0	0	0
None	0.0	34	20,091	0	34	20,091	0
Totals		100	59,170	30,498 ¹	100	59,170	304,984 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.52 under present conditions; 5.2 if disturbed.

SAN RAFAEL REEF WSA

there is no natural vegetation, or practically none, such as cliff faces and rocky slopes.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper/ desert shrub	45,010	76
Barren	6,180	10
Pinyon-juniper/ grassland	3,314	5
Saltbush	26	1
Grassland	4,640	8
Total	59,170	100

Source: USDI, BLM, 1979a.

The pinyon-juniper type is found on the foothills and mesas and other areas of relatively high elevation and precipitation in the area. Major species are pinyon pine and Utah juniper. The pinyon-juniper type stops at lower elevations due to low precipitation, high temperatures, and salty substrate.

The desert shrub type makes up the eastern boundary of the WSA. The area dominated by this type is characterized by low precipitation, high temperatures, and rapid evaporation. Semidesert shrubs belonging to the Chenopodiaceae and Compositae families make up the desert shrub vegetation type and include Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, four-wing saltbush, black sagebrush, saltbush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandhill muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell area, including wavy leaf oak, sand sagebrush, and purple sage.

The grassland type is similar to the sagebrush, saltbush, and desert shrub vegetation types, but is distinguished by a predominance of grasses over shrubs. The major grasses are curly grass, blue grama, Indian ricegrass, and dropseed. Other grasses include western wheatgrass, Fendler threeawn, needle and thread, and squirreltail. Other common plants are shadscale, Mormon tea, black sagebrush, rabbitbrush, and snakeweed.

As the name implies, the pinyon-juniper/grassland type is comprised of pinyon-juniper woodland and grassland species such as curly grass, blue grama, Indian ricegrass, dropseed, and the

other species listed for the grassland type.

There are no riparian areas within the WSA.

Eight candidate, proposed endangered, or endangered plant species have been identified (refer to Table 5) in or near the WSA. (Candidate species are those species under active consideration for listing by the Fish and Wildlife Service [FWS]. Proposed endangered species are those nominated in the *Federal Register* for listing as endangered.) These plants may occur in other similar areas not inventoried.

TABLE 5
Endangered, Proposed Endangered,
and Candidate Plant Species

Species	Status	Date of Listing
<i>Cycladenia humilis</i> var. <i>jonesii</i> ¹	Proposed Endangered	As of 09/27/85
<i>Erigeron maguirei</i> var. <i>maguirei</i>	Endangered	As of 09/27/85
<i>Hymenoxys depresse</i> ¹	Candidate	As of 09/27/85
<i>Pediocactus despeinii</i>	Candidate	As of 09/27/85
<i>Psoralethumus polyadenius</i> var. <i>jonesii</i>	Candidate	As of 09/27/85
<i>Sclerocactus wrightii</i> ¹	Endangered	Listed on 10/11/79
<i>Schoencrembe bernebyi</i> ¹	Candidate	
<i>Sphaerolceae psorelloides</i>	Candidate	As of 09/27/85

Source: USDI, FWS, 1983.

¹Known to occur in the WSA.

The San Rafael Reef WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) of the WSA is listed on Table 6. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 6
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Pinyon-juniper woodland	13,885	23
Saltbush-greasewood	9,783	17
Galleta-threeawn shrub steppe	35,502	60
Total	59,170	100

Source: USDI, Geological Survey, 1978.

Water Resources

All 22 perennial waters in the WSA are either springs or water holes, mostly located along the base of the San Rafael Reef. The only exceptions occur in Straight Wash and its tributary and Crawford Draw. Charley Hole, Crawford Hole, and Red Draw Tanks are not perennial. There are also an undetermined number of small, unmapped slickrock potholes along the crest of the Reef.

Water use is primarily by wildlife and domestic livestock. There are two stock reservoirs in the WSA (neither are functional at present).

Water quality data are lacking from this area. All of the slickrock tanks or water holes and most of the springs are contained in a small basin and do not flow except during severe storms. Water may be stagnant from algae bloom and die-off cycles. Salinity, taste, and coliform bacteria may present a problem for human consumption.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy, had each WSA in Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system. The potential for mineral resources in the WSA is low to moderate due to a marginally favorable geologic environment.

An overall importance rating (OIR) of 2- was assigned to the San Rafael Reef WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR applies to 75 to 100 percent of the tract evaluated by SAI. Uranium and vanadium are the most important resources to potentially exist within the WSA, but the geologic environment is favorable for small deposits only. A summary of the SAI energy and mineral resource rating for San Rafael Reef is shown in Table 7. All resources within the WSA were assigned low favorabilities or listed as none. The BLM ranks the favorability for gypsum as moderate.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation

**TABLE 7
Mineral and Energy Resource Rating Summary**

Resource	Rating		Estimated Resource
	Fevorebility ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million berrels of oil, less than 60 billion cubic feet of gas
Tar Sand	f2	c4	Less than 10 million berrels
Uranium/ Vanadium	f2	c4	Less then 500 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c1	Low temperature
Hydropower	f1	c4	None
Copper	f2	c2	Less then 50,000 tons of contained copper
Manganese	f2	c1	100,000 tons of 40-percent manganese
Potash	f2	c2	Less then 1 million tons

Source: SAI, 1982³.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³SAI did not rate gypsum; however, BLM has added text information.

report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of vanadium, manganese, and copper that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983). Although copper is listed as strategic, it is relatively common and supplies currently exceed domestic demand.

LEASABLE MINERALS

There are no existing mineral leases in the WSA other than oil and gas. Other leasable minerals produced regionally include potash and coal. Tar sand could become a production interest and be leased in a combined hydrocarbon lease that would also include oil and gas.

SAN RAFAEL REEF WSA

Oil and Gas

The tract evaluated by SAI contains 73,270 acres. The WSA is 59,170 acres and accounts for 81 percent of the tract. The SAI favorability rating indicates that a low potential exists within the tract for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. The certainty level indicates there are no direct data available to support or refute the occurrence. Positive evidence of resource occurrence is far removed from the tract or is on a trend considered unrelated to the geology of the tract. (Refer to Appendix 6 for information on the recoverable resource.)

In the original 55,540-acre WSA, there are currently 31 existing oil and gas leases covering approximately 68 percent (38,620 acres) of the WSA. Five percent (3,022 acres) are pre-FLPMA and 63 percent (35,598 acres) are post-FLPMA. With the boundary modification, about 42,250 acres are under existing oil and gas leases (4,920 acres pre-FLPMA and 37,330 acres post-FLPMA). The WSA was included in the "Price District Oil and Gas Categories Environmental Assessment Record" (USDI, BLM, 1975). The results established oil and gas categories for the 59,170-acre WSA; these are listed in Table 8.

TABLE 8
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	33,140	56
2. Open with special stipulations	0	0
3. Open with no surface occupancy	24,750 ¹	42
4. No leasing	1,280	2
Total	59,170	100

Source: USDI, BLM, 1975.

¹All additional 3,630 acres added with the boundary modification are under Category 3.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

The San Rafael Swell is a structural trap. The interior of the Swell has been eroded away, allowing any petroleum contained in the structure to escape. The Swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the Swell. The Ferron Gas Field, 20 miles northwest of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formations do not occur in the WSA. The Last Chance Gas Field, 18 miles to the west, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail Field, 37 miles to the north, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

One oil and gas well was drilled in the WSA. The well was drilled to a depth of 2,218 feet, plugged, and abandoned on July 29, 1957. Four other oil and gas wells were drilled from 0.25 mile to 1 mile from the WSA. All four were drilled, plugged, and abandoned between 1921 and 1970. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is felt, therefore, that any oil and gas occurrences in the WSA would probably be small pools and/or fields. Traps occurring in the WSA could be either stratigraphic or structural (due to small faults). The WSA is probably too far from the center of the Swell to contain much, if any, petroleum within the older (Mississippian, etc.) formations because the petroleum collects in the apex of anticlines.

This, however, does not rule out traps due to faulting.

Tar Sand

The San Rafael Swell Special Tar Sand Area (STSA) was designated in 1982. The STSA is 130,292 acres in size, of which about 1,920 acres are within the northern portion of the San Rafael Reef WSA. The oil and gas leasing categories were amended in 1984 to also apply to the tar sand resource in the STSA (USDI, BLM, 1984a). Of the 1,920 acres in the WSA, 320 acres are in Category 1 (standard stipulations), 320 acres are in Category 3 (no surface occupancy), and 1,280 acres are in Category 4 (no leasing). No applications were filed to convert existing oil and gas leases in the San Rafael Reef WSA to combined hydrocarbon leases as provided for by the Combined Hydrocarbon Leasing Act. However, the tar sand resource could still be developed in the future through a competitive leasing process.

The low SAI favorability rating for tar sand indicates a high potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. The high certainty level recognizes oil-impregnated rocks are in the WSA, regardless of the associated favorability. It is unlikely the tar sand within the WSA will be developed due to small-sized deposits, scarcity of water, and distance to the nearest railhead or pipeline.

Coal

The WSA is considered geologically unfavorable for coal; Cretaceous coal-bearing strata either never were deposited or have been eroded away. The SAI rating for coal indicates there is no deposit.

Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousands of feet thick in the area of Moab where potash is produced commercially. The formation thins considerably to the west and, by the time the Swell has been reached, the formation has reduced to a thickness of 500 feet or less.

The low SAI favorability rating indicates that, if deposits occur in the WSA, they will contain less than 1 million tons of potash. The certainty level implies that no direct data occur within or very near the WSA, although the WSA is within a recognized evaporite basin. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it unlikely that the potash resource in the WSA would be developed.

Hydropower

A survey of potential hydropower sites in Utah indicated that no potential sites have been identified in or near the WSA. On the basis of that information, SAI rated the WSA as having no hydropower potential.

Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low temperature thermal waters (between 20 and 90 degrees Centigrade [C]). Water extracted at these temperatures can be used for direct heating purposes. SAI rated the geothermal resource potential as low. It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource and the associated high drilling costs.

LOCATABLE MINERALS

In the 59,170-acre WSA there are 1,006 mining claims, covering approximately 11,942 acres or 20 percent of the WSA. None of these claims have been patented. It is believed that the majority of these claims were located for uranium and vanadium, although some silver interest has been expressed. Only about 60 of the claims appear to have current assessment work. In the 55,540-acre WSA there are 751 mining claims encompassing 9,690 acres.

Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These deposits are generally small (1,000 to 5,000 tons of ore) and scattered. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock Members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member.

Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable.

The southern belt, which runs through the southernmost part of the WSA, is most favorable for the occurrence of ore deposits. Moderate and large-size ore bodies are found in the southern belt which roughly parallels the Muddy and Dirty Devil Rivers (Hawley et al., 1968). Also, the ore bodies of the small Temple Mountain District, located a few miles south of the WSA, occur chiefly in the Chinle Formation. Some of the

deposits contain 10,000 tons or more of uranium and vanadium ore in tabular bodies and as rolls. Small ore bodies are also contained within the curious collapse structures that occur throughout the Temple Mountain District. These structures are plug-like masses up to 3,000 feet in diameter, consisting of a central core of infolded strata and brecciated rock. They are presumably derived from the collapse of overlying formations into subsurface voids resulting from dissolution of carbonates and salts (SAI, 1982). The majority of the mineral production activity has come from the Temple Mountain Mine located adjacent to the southern boundary of the WSA.

Smaller ore bodies (5,000 tons and less) occur in the northern belt, which is more favorable for uranium occurrence than the southern belt. The northern belt parallels the San Rafael River and reaches into the northern part of the WSA. The Cliff Dweller Mine, located in the WSA, produced 268 tons of ore up to 1973.

The east-central part of the San Rafael Swell is considered relatively unfavorable for uranium and vanadium based chiefly on the lack of channels and the thick, massive character of some of the otherwise favorable host rocks (such as the Mossback Member), and also because the area lacks folds and altered rock (SAI, 1982). On this basis and because of the large amount of past exploration in this area, SAI has rated the uranium/vanadium favorability as low (less than 500 tons of uranium oxide).

The Chinle Formation outcrops from the northeast to the southwest portion of the WSA. The thickness of the overburden increases to the west, while the Chinle Formation does not occur to the east of the outcrop. Within the outcrop, it is felt that most of the surface deposits have been located. Remaining deposits are likely to occur in the subsurface where drilling for exploration and development would be required. Extraction costs would be greater in the western areas and would probably be less attractive.

Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville Formations. The nearest deposits are 14 miles east of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low SAI favorability rating indicates a deposit size to 100,000 tons of 40-percent manganese. However, SAI also indicates that, in fact, the WSA is favorable for only very small accumulations, several tons at the most.

Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is with the Copper Globe Mine located about 1 mile south of the Devils Canyon WSA (approximately 15 miles west of the WSA). The mine produced 2 or 3 tons of ore during World War I and has only produced mineral specimens and jewelry pieces since then.

The SAI favorability rating indicates a low potential for copper deposits in the WSA and, if found, these would be small in tonnage (less than 50,000 tons of contained copper).

Gypsum

The Carmel Formation is reported to contain an 8-foot-thick bed of high grade gypsum in the northeastern portion of the WSA. BLM data indicate a moderate potential of occurrence. If a deposit does exist within the WSA, it would be moderate in tonnage (5 to 100 million tons). It is unlikely that any gypsum would be developed due to distance of mines to their market and lack of cheap transportation.

SALABLE MINERALS

No known salable minerals are found in the WSA, although a sand and gravel resource is probable.

Wildlife

The San Rafael Reef WSA provides habitat for a limited variety of wildlife species. Except for several springs and deep water holes, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock potholes are a good source following rains, but they cannot be relied on by wildlife because of drying out during extended drought periods. During the winter, snow can provide water when available. Vegetation is also limiting due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer (less than 1 deer per square mile). Desert bighorn sheep were reintroduced into the WSA during January 1983 and January and February 1984. Pronghorn antelope occur east of the WSA and may utilize the WSA. A bull buffalo was sighted adjacent to the WSA in 1982.

UDWR and BLM have designated 27,311 acres in the WSA as high-priority desert bighorn sheep habitat. The remainder of the WSA (31,859 acres) is limited-value desert bighorn sheep habitat. Lambing and rutting grounds, along with water sources, are considered critical habitat; however, these habitats are currently being inventoried and their acreages are unknown at this time. The

SAN RAFAEL REEF WSA

majority of these critical habitats occur within the WSA's high-priority desert bighorn sheep habitat. Currently the WSA provides 50 percent of the habitat for the desert bighorn sheep in the South San Rafael Herd. About 68 percent (approximately 30 animals) of the herd resides in the WSA.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, blacktail jackrabbits, woodrats, ringtails, badgers, Ord kangaroo rats, gray foxes, kit foxes, white-tail antelope ground squirrels, chipmunks, rock squirrels, bats, mice, and voles.

Habitat for various small bird species is found within the WSA. Species diversity and population sizes are small due to the lack of a diverse habitat. The San Rafael Reef, along with various cliffs and canyons, provides many nesting, roosting, and foraging opportunities for birds. Few individual raptors are found in the WSA. Of those present, golden eagles, prairie falcons, American kestrels, red-tailed hawks, ferruginous hawks, and rough-legged hawks (winter residents) are the most common. Chukars are found in the WSA and are dependent on available water. Mourning doves are also found in this WSA.

Several species of snakes and lizards could be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, western rattlesnakes, and western terrestrial garter snakes are the most common snake species. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Mountain lions may occasionally visit the area, but with low deer numbers this would be a rare occurrence. No documented sightings are recorded.

No fish species occur in the WSA. Tadpole shrimp (a crustacean) may be found in some potholes.

The peregrine falcon (an endangered species) is a possible visitor to the WSA, although no known sightings in the WSA have been recorded. The most likely place to find peregrines would be the Straight Wash drainage. No other threatened or endangered species are known to inhabit the WSA. The golden eagle, a sensitive species recognized by BLM, occurs within the WSA.

There are no proposed or existing wildlife management facilities within the WSA.

Forest Resources

The dominant forest type is pinyon-juniper wood-

land which is found in sparse quantity within the WSA (45,010 acres). This community is used commercially throughout the Southwest for firewood, fenceposts, and Christmas trees. Because of remoteness from populated areas and availability of such products closer to population centers, BLM has closed the WSA to these uses. Harvest of the pinyon-juniper woodland in the past has been minimal.

Livestock and Wild Horses/Burros

The San Rafael Reef WSA contains portion of five grazing allotments. Grazing was authorized in all five allotments prior to the passage of FLPMA. Table 9 contains livestock grazing use data for this WSA. All allotments in the WSA are administered by the San Rafael Resource Area of the Moab District.

Range developments in the WSA are limited to two stock reservoirs (neither are functional at present). At present there are no plans for additional range developments in the WSA.

There are no known herds of wild horses that frequent the WSA; however, a small herd of wild burros (7 to 10 animals) can often be found in the northwestern portion of the WSA.

Visual Resources

The most outstanding visual features of the San Rafael Reef WSA are the deeply carved drainages and the sawtooth ridge of the Reef itself. Rising at a near vertical angle from the desert floor, huge upturned sandstone fins dominate the scenery for over 12 miles of the WSA. Deep-cut canyons find their way through the Reef, adding character to an already unique desert scene. There are few views within the Reef that do not involve a panoramic scene into a deeply cut canyon or an enclosed view dominated by a vertical red sandstone wall or tremendous fin.

The vertical rise of the Reef is best displayed in the northeastern half, from Straight Wash to I-70. Behind the Reef to the west lies a narrow valley bordered on both sides by a mass of uplifted land. To the east are the colorful terraces of the Reef's backside. To the west is a jumbled congregation of rocks, slides, and talus slopes.

The southeastern half of the Reef is cut many times with twisted and colorful drainages. The Reef takes on a more rolling character here, with large domes and mounds of slickrock rather than fins. Vertical red sandstone walls line the drainages, nearly meeting and forming very narrow passages.

SAN RAFAEL REEF WSA

Table 9
Livestock Grazing Use Data

Allotment	Class of Livestock	Number of Operators	Season of Use	Total AUMs ¹ in Allotment	Total Acres in Allotment	AUMs in WSA
Big Pond	Sheep	2	10/01 to 03/31	2,056	24,231	362
			05/11 to 06/10	126		
			10/16 to 02/28			
Black Dragon	Cattle	1	11/01 to 04/15	3,223	48,837	410
Georges Draw	Sheep	1	10/01 to 02/25	988	13,722	262
Iron Wash	Cattle	1	03/01 to 12/31	4,980	126,870	240
Taylor Flat	Sheep	2	11/01 to 04/30	1,432	35,066	70
Total		7		12,805	248,726	1,344

Source: USDI, BLM, 1979a.

¹Totals are for Federal lands only.

The central and northern portions of the WSA are characterized by a checkerboard pattern of rust, tan, and orange sandstone slabs, criss-crossed by fault and fracture lines. Green vegetation dots the area, adding an element of color and variety to the texture.

The WSA is classified as having Class A scenery along 26,350 acres of the Reef and its major drainages (Ray Mann Associates, 1977). They contain the most outstanding characteristics of the physiographic region. The northwestern part of the WSA is classified as having Class C scenery (8,320 acres) and the southwestern portion as having Class B scenery (24,500 acres). Class C scenery contains rolling terrain and very little variation in landform; Class B scenery has interesting erosional patterns and some steep canyons. Both areas of Class B and C have been rated medium in sensitivity, except for a portion along I-70 where a scenic corridor is rated high for sensitivity. These medium sensitivity areas are also seldom seen. A high sensitivity level is given for the Reef. Based on these factors, the San Rafael Reef WSA falls under VRM Class II (26,350 acres), Class III (2,880 acres), and Class IV (29,940 acres). An explanation of BLM's VRM system can be found in Appendix 7.

Cultural Resources

One 10-acre parcel of land located in the WSA has been inventoried for cultural significance. One site was located during the inventory. The site has been recorded as a rock art panel and a cave. Five other sites have been recorded in the WSA. Three of these sites contain rock art; the other two sites contain rock art, features, and artifacts. These

sites have not been evaluated by an archaeologist, nor have they been nominated or listed on the National Register.

It is believed that the many drainages of the Reef may contain archaeological sites, some of which could be eligible for National Register nomination.

Located along the WSA's eastern boundary are the Green River-Hanksville roads. During the early years of this century, the mail was carried by horseback through the desert from Green River to Hanksville. This trail was the most direct route, but the soils were too sandy for use by wagons. As a result, the wagon routes between the two towns were placed on the firmer soils close to the Reef. It is believed that one route, close to the Reef, was utilized for heavy freight wagons. The other trail, located somewhat to the east, was used by light wagons. In some sections of the WSA there is evidence of this early trail on the ground (Iron Wash), but substantial portions of the trail have been bladed or otherwise recently utilized.

Recreation

The majority of recreational use occurs along the eastern boundary of the WSA, as well as in several drainages cutting through the San Rafael Reef. The main recreational activities known to occur within the WSA are hiking, backpacking, cultural exploration, and educational study. This use is estimated at over 400 visitor days per year. Motorcycle riding and four-wheel driving are two popular activities in the southern and eastern portions of the WSA. Occasionally motorcyclists ride through the major drainage north of Temple Wash and Farnsworth Tanks; however, the canyon is narrow and access is difficult. Off-road

SAN RAFAEL REEF WSA

vehicle (ORV) use is associated with the 10 miles of ways and trails in the WSA and 10 miles of road along the boundaries. Sometimes the mouths of canyon drainages are used by ORVs. Trails run from Temple Wash to Iron Wash, along the first drainage south of Old Womans Wash; in Iron Wash and Straight Wash; and north approximately 1 mile from Greasewood Wash to I-70. The majority of the ORV use occurs during the spring months, usually concentrated on the Easter weekend, and consists mainly of ORV play. Recreationists use the desert and Goblin Valley State Park south of the WSA as camping areas. The exact number of ORV riders using the WSA is unknown; however, public concern and interest in the area has been high, and it is estimated that the area receives about 250 visitor days per year.

The WSA has been used by educational groups. Most of the interest is related to the area's unique geology which attracts college students from many states to study the San Rafael Swell and Reef.

The historic significance of the wagon roads and mail route in the WSA have already caught the interest of some recreationists. An organized motorcycle race, the Mail Run, has been held for the past 8 years. The 100-mile course roughly parallels the old mail route outside of the WSA. Other recreationists come to the area to search for the routes.

Rock collecting is another recreational activity pursued within and near the WSA. Greasewood Draw has been identified by local representatives of the Utah Federation of Gem and Mineral Societies as containing extremely rare values. This area offers grape agate, selenite crystals, and jasper. The density of collectable materials is relatively low, but grape agate is extremely uncommon. Greasewood Draw is apparently one of the few locations in the country where it can be found.

Under the San Rafael Resource Area MFP, ORV designation for the 59,170-acre WSA is open in accordance with 43 CFR 8340. ORV designations had not been implemented in the San Rafael Resource Area as of July 1983.

There are no recreational facilities within the WSA. Evidence of the early mining exploration is present. Several shafts and tunnels can be found along the Reef and associated trails can be followed into drainages and canyons. Approximately 8 miles south of the WSA is Goblin Valley State Park, a recreational fee area that provides 15 camping sites, a restroom, foot trails, and a ranger station. The State Park emphasizes recreational

use of the San Rafael Swell and the San Rafael Reef WSA with printed material, slide shows, and talks. Most of this information caters to the ORV user or passenger vehicle recreationist.

The amount of recreational use occurring in the WSA is not known. User statistics show the surrounding desert and Goblin Valley State Park receive over 4,000 recreationists on Easter weekend. If even a portion of those using the surrounding area were to venture into the WSA, in addition to those already taking advantage of it, a large user number could occur.

The San Rafael Reef WSA offers the recreationist a variety of experiences such as hiking, backpacking, rock scrambling, cultural exploration of narrow, twisting canyons, and wildlife viewing. The canyon system in the WSA could provide a variety of loop trips, both easy and challenging. Various pools, arches, and slickrock gardens add to the interesting visual character of the area and complement the recreational experience.

In summary, while no actual use figures are available, recreational use in the WSA is currently estimated at 650 visitor days annually. No visitor days are related to commercial outfitting. Approximately 62 percent of the use (400 visitor days) is attributed to primitive recreational activities (such as hunting and sightseeing) that currently utilize vehicular access on existing ways. Approximately 38 percent (250 visitor days) are attributed to ORV activity.

Wilderness Values

SIZE

The WSA includes 59,170 acres. It is about 22 miles northeast to south and 6 to 8 miles east to west.

NATURALNESS

The major imprints surrounding the San Rafael Reef WSA were eliminated by boundary adjustments during the *BLM Intensive Wilderness Inventory*. What remains of note are approximately 10 miles of ways and trails, an oil drill site, and several tunnels and associated mining buildings and equipment.

A way, probably associated with mineral exploration, exists in the first drainage south of Old Woman Wash. The way is approximately 4 miles long and ends atop a bench. It is little used and is substantially unnoticeable. Another way, about 2 miles long, is located south of Arson's Garden. The way leads to an old drill site. Both the way and drill site are recovering; however, there is some travel on the way.

SAN RAFAEL REEF WSA

Several other trails about 3.50 miles in length exist in the WSA and are located in Straight Wash, the first canyon north of Straight Wash, in portions of Iron Wash, and the first major canyon north of Temple Wash (west side of the Reef). The action of the washes has eroded the trails, making them substantially unnoticeable. Some ORV travel takes place in the wash bottom; however, after flooding, evidence of use is erased.

Two tunnels and associated mine shacks are located in two drainages along the northeast half of the Reef. The imprints look old enough to be historic and they blend into their primitive environment. Also, an old-time drill rig is located near a way north of Ernie's Canyon. The way totals about a 0.50 mile in length, and both the way and rig are substantially unnoticeable within the WSA.

These imprints cover about 2,800 acres (less than 5 percent) of the WSA. The remaining acreage (56,370 acres) is essentially untouched. Both areas meet the naturalness criterion for acres under wilderness review. Therefore, the entire 59,170-acre WSA is considered natural in character.

SOLITUDE

The WSA offers outstanding opportunities for solitude. The many incised drainages through the Reef offer passages for the user to experience seclusion and isolation. The twisting character of the canyons and 10- to 1,000-foot cliffs effectively shroud lines of sight and suppress sounds for any substantial distance within these canyons. Off-site intrusions and influences are essentially nonexistent within these canyons.

The higher reaches of the WSA, consisting of sandstone knobs, petrified dunes, checkerboarded mesas, and the Reef's jugged fins, are intermittently open and provide vantage points. To the east is the San Rafael Desert, to the west is the mesa of the Swell, and to the north and south is the sawtooth ridge of the Reef. Vegetation cover is sparse in some areas and does not effectively screen visitors. The rolling terrain and immense topographic character of the area, however, allow for separation and the feeling of seclusion. With an expansive view of the surroundings, a user can experience the feeling of remoteness.

From specific points within the WSA, several dirt roads and traffic on U-24 (3 miles east) and I-70 (adjacent to north boundary) can be seen outside the WSA. Their observation is not necessarily intruding and may actually, as a comparison, emphasize the remoteness of the users' recreational experience. Within 0.25 mile of I-70, sounds

from traffic are very noticeable and at times intruding. Because of the imposition of these sounds, the opportunity for solitude is less than outstanding in the area. During the spring months the sounds from ORV activity near the southern boundary of the WSA are also imposing to solitude.

In summary, in over 99 percent of the WSA (58,578 acres), the opportunities for solitude meet the outstanding criterion for areas under wilderness review. The remaining 1 percent (592 acres) does not meet the solitude criterion.

PRIMITIVE AND UNCONFINED RECREATION

Educational groups, rock hounders, and backpackers currently use the WSA as an instructive and recreational experience. Trips involve hiking the canyon drainages through the Reef. Historic, prehistoric, and geologic qualities are observed, studied, and collected.

During the spring holidays recreationists travel to the desert to enjoy the warm weather. ORV use, the main recreational activity, is concentrated adjacent to the southern portion of the WSA and some visitors venture into portions of the WSA along the eastern boundary. Due to the restrictive character of the WSA's topography, many of these recreationists explore the area by foot. Outstanding opportunities for hiking, backpacking, rock scrambling, art, photography, and scenic viewing await these explorers.

Many isolated pools of water provide contrast to the dry, desolate character of the WSA. The dramatic nature of the Reef's formations with its sheer-walled cliffs, pinnacles, knobs, twisted canyons, colors, and historic and prehistoric remnants all contribute to a high quality recreational experience.

The unusual topographic character of the WSA adds to outstanding hiking, rock scrambling, and camping. Also, the presence of water sources, a rare collectable agate, and several other outstanding recreation opportunities allow the entire WSA (59,170 acres) to meet the standards for outstanding opportunity for primitive and unconfined recreation.

SPECIAL FEATURES

The canyons of this WSA offer many exposed geologic strata and formations, including arches, caves, and narrow textured passageways. The upper reaches provide dramatic views of the vertical rise of the San Rafael Reef and its many fins and folds. The rare grape agate is another value within the WSA thought to be found in only a few places in the country.

SAN RAFAEL REEF WSA

Few prehistoric sites have been recorded; these are represented by small pictograph or petroglyph panels and small habitations in rock shelters. Evidence of old mining activity can be found near the northeastern and southwestern boundaries of the WSA. Shacks, cabins, and mine shafts dot the area, providing a historic flair to the natural surroundings. Evidence of the old Green River to Hanksville wagon trails also add historic significance to the WSA.

Land Use Plans and Controls

There are no private in-holdings, private subsurface rights, or rights-of-way in the WSA.

There are six State sections (4,029.36 acres) within the WSA and 10 adjacent State sections. The management philosophy for all State sections is to maximize economic returns for the State School Fund. Except for grazing on five of the six State sections within the WSA, no activities are presently occurring on these sections, although they are under lease for minerals.

The area is identified for multiple use management by the BLM. It is managed by the San Rafael Resource Area under the San Rafael MFP (USDI, BLM, 1979a).

The *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984) classified the WSA as potential future mining and grazing land.

Socioeconomics

DEMOGRAPHICS

The WSA is located in south-central Emery County and designation or nondesignation of the WSA as wilderness would mostly affect that county. The two closest communities are Green River (about 14 road miles east of the WSA) and Hanksville (about 22 road miles south of the WSA). These communities are the main gateways to the WSA. Hanksville is in Wayne County and Green River is in Emery County.

Emery County had a 1982 population of 12,900 (University of Utah, Bureau of Economic and Business Research, 1982). Most of the population is concentrated in a series of small communities in Castle Valley which runs through the northwestern part of the county. There are two service centers in this part of Emery County: Castle Dale, the county seat (1980 population of 1,910) and Huntington (1980 population of 2,316) (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The Town of Green River is located in the eastern part of the county and had a

1980 population of 1,282. Hanksville and the surrounding area had a 1980 population of 351 and is the only community located in eastern Wayne County.

Emery County contains 4,449 square miles of land. About 82 percent of the county is owned by the Federal Government, 11 percent by the State and 7 percent by private residents.

EMPLOYMENT

Statistics (refer to Table 10) indicate that almost half of the income earned in Emery County and about 40 percent of the employment is from mining, mostly for coal. Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important sources of employment and income. Agriculture accounts for less than 1 percent of the county income and less than 1 percent of total employment.

TABLE 10
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	Less than 1
Total Agriculture	1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate Services	1	1
Other	2	6
	-	-
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated. Tourism is included as part of Services, Retail Trade, and Other Services.

SAN RAFAEL REEF WSA

During 1970 to 1980, Emery County experienced the largest percentage change in population, increasing by about 123 percent (5,137 to 11,451). This increase was brought about by construction of the powerplants mentioned above and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at various times during the county's history.

Unlike the rest of Emery County, Green River has not grown in the past 30 years. Major employment includes mining, government, agriculture, and tourism. Recent uranium mine layoffs have significantly increased unemployment in the area. Because the community's population has remained stable over the past 30 years, its infrastructure has required only minor adjustments, and problems associated with population growth have not occurred. Hanksville has few services; those available include several gas stations, a general store, a motel, and a restaurant. Major local employment includes government, mining, and agriculture. Most mining jobs are located outside Wayne County. Recent layoffs (1982) in the uranium industry have had a significant impact on the community, and local unemployment rates are high.

INCOME AND REVENUES

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and dispersed nonmotorized recreation. Table 11 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

TABLE 11
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	Less than \$100,000	None
Mineral Production	None	None
Oil and Gas Leases and Production	None	Up to \$126,750
Livestock Grazing	\$26,880	\$1,882
Recreational Use	Less than \$2,665	None
Total	Less than \$129,545	Up to \$128,632

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Limited production from mines and prospects within and adjacent to the WSA has brought an unquantified amount of income and employment

to nearby residents. The amount of income and employment from this production would be low.

The WSA has about 1,006 mining claims; of these, only about 60 claims appear current in assessment work. Regulations require an \$100 per claim expenditure for labor and improvements, an undetermined part of which is spent in the local economy. One oil and gas well has been drilled in the WSA over the past 28 years. This drilling generated an estimated 1.5 work years of employment over the past 28 years, some of which represent local employment.

Seven livestock operators have grazing privileges in the WSA. Based on the use of 1,344 AUMs of forage by cattle, it is estimated that the WSA accounts for \$26,880 of livestock sales, \$6,720 of ranchers' returns to labor and investment, and a total \$24,000 of income earned in the area.

The WSA supports private (both motorized and nonmotorized) recreation use. Use is low and recreation-related expenditures are locally insignificant. The actual amount of income generated locally from recreational use in the WSA is also unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. Total recreational use for the San Rafael Reef WSA is estimated as about 650 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contribute to the local economy of Emery County.

No woodland products are harvested from the WSA; therefore, woodland harvest does not contribute to the local economy.

The WSA generates revenues to the Federal Treasury from two sources: grazing and mineral leasing. Based on 1,344 AUMs of forage allotted to livestock in the WSA, the WSA annually accounts for \$1,882 of grazing fee revenues (at \$1.40 per AUM) to the Treasury. One half of this amount (\$941) is allocated back to the local BLM District for the construction of range improvement projects.

Within the WSA, about 42,250 acres are currently leased for oil and gas. At \$3 per acre, this generates about \$126,750 annually. Half of this, or about \$63,375, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to mitigation of impacts from energy development.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 3 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the WSA would be related to oil and gas, locatable mineral, and tar sand exploration and development. Even though the WSA would be open to resource use and development without controls for wilderness protection, no major changes would be expected to occur. The degree of future development is

unknown, but would probably be low due to the rough terrain, development restrictions as discussed in the San Rafael Resource Area MFP, and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas and tar sand, 160 acres; uranium and copper, 20 acres; manganese, 120 acres; and potash, 40 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA currently meets Class II air quality classification and would continue to be managed as a PSD Class II area. Disturbance of 340 acres would result in only minor increases in fugitive dust emissions. Other than the possibility of tar sand development, no major sources of air pollutant emissions are proposed in the vicinity of the WSA. If tar sand were developed (low probability) air quality could deteriorate up to the Class II limitations depending on the type of extraction and degree of on-site processing.

GEOLOGY

Few impacts to geology are expected because surface disturbances associated with locatable minerals (i.e., uranium, copper, etc.), oil and gas, and tar sand (in-situ) exploration and development activities would probably not exceed 340 acres. This would not significantly affect geology. Some subsidence and fracturing of formations related to tar sand extraction could occur on portions of the 1,920 acres in the San Rafael Swell STSA.

SOILS

It is estimated that up to 340 acres of soil could be disturbed by mineral exploration and development. The average loss at present in the WSA is estimated to be about 0.52 cubic yard/acre/year. Soil loss on areas that would be disturbed has been estimated to be 5.2 cubic yards/acre/year. Therefore, soil loss on the 340 acres would increase from 177 cubic yards/year to 1,768 cubic yards/year. Soil loss would decrease as reclamation occurred; however, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase about 5 percent from approximately 30,498 cubic yards to 32,089 cubic yards per year.

VEGETATION

The anticipated maximum of 340 acres disturbed

SAN RAFAEL REEF WSA

would not significantly impact the WSA's vegetation types. The probability of surface disturbance is low due to rough terrain and economic constraints for development.

Eight species of candidate, proposed endangered, and endangered plants are found within or near the WSA (refer to Table 5). Before authorizing surface-disturbing activities (340 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would consult with the FWS as required by BLM policy (refer to Appendix 4). The BLM would request a biological opinion when appropriate as required by the Endangered Species Act. Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of endangered or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Surface disturbance from mineral and energy exploration and development could impact 340 acres under this alternative, with a soil loss increase of approximately 1,591 cubic yards/year. However, since precipitation is low and no perennial streams are located in the WSA, no significant sedimentation or change in total dissolved solids (TDS) is expected to occur as a result of the increase in soil loss. Two stock reservoirs are located in the WSA. Opportunities for maintaining additional improvements or expansion of existing water sources could occur but are not planned in the current MFP for the area.

Mineral exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not significantly change ground water quantity or quality. However, extraction of tar sand would result in degradation of ground water quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The oil and gas leasing categories in the WSA would remain the same (33,140 acres in Category 1, 24,750 acres in Category 3, and 1,280 acres in Category 4). The wilderness stipulations on post-FLPMA leases would be lifted and about 15,640 acres would remain available for lease consideration.

The WSA is considered to have low potential for oil and gas occurrences with less than 10 million barrels of oil (3 million estimated recoverable) and less than 60 billion cubic feet of natural gas

(18 billion estimated recoverable). These oil and gas resources could be explored and developed without concern for wilderness values. Stipulations developed in association with the oil and gas leasing categories would still apply. Approximately 160 acres of surface disturbance would take place if exploration and development were to occur. Due to the small size of the potential deposits and rugged terrain characteristics of the WSA, exploration and development would be expensive, difficult, and unlikely.

Tar Sand

Some 1,920 acres of the San Rafael Swell STSA are located in the northern portion of the WSA. No applications were received to convert oil and gas leases in the WSA to combined hydrocarbon leases for development of the tar sand resource. It is possible that combined hydrocarbon leases could be issued in the STSA portion of the WSA on a competitive basis in the future. However, even if leased, it is unlikely that the tar sand resource within the WSA would be developed due to small-sized deposits, scarcity of water, distance to the nearest railhead or pipeline, and the restrictive leasing categories in the WSA (refer to Affected Environment, Mineral and Energy Resources section).

Potash

The entire WSA would be open to potash leasing. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire area would remain open to mining claim location. The potential deposit of less than 500 tons of uranium oxide, less than 50,000 tons of copper, less than 100,000 tons of manganese, and 5 to 100 million tons of gypsum could be developed. It is felt, however, that surface deposits have been explored and only subsurface deposits may be possible. Rugged terrain characteristics of the WSA would increase the cost of subsurface exploration or development.

WILDLIFE

Wildlife could be adversely affected by possible surface-disturbing activities (340 acres) and continued ORV use. Surface-disturbing activities would occur in both the 27,311 acres of high-priority habitat and 31,859 acres of limited-value habitat for desert bighorn sheep. Lambing and rutting grounds, along with water sources (also considered critical habitat), occur within the

WSA's high priority desert bighorn sheep habitat. The WSA provides 50 percent of the habitat for desert bighorn sheep in the South San Rafael Herd. If surface-disturbing activities and continued ORV use were to occur in these critical habitats, up to 68 percent (about 30 animals) of the South San Rafael desert bighorn sheep herd could be displaced. Adverse impacts would be short term while work was ongoing. However, this impact is considered unlikely.

FOREST RESOURCES

The WSA would remain closed to woodland harvest as directed by the San Rafael Resource Area MFP. Occasional recreation use (campers and hikers) and mineral-related surface-disturbing activities (340 acres) would not result in the loss of significant portions of the forest resource in the WSA.

LIVESTOCK AND WILD BURROS

Domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 1,344 AUMs currently allocated in the WSA are controlled by seven livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Since very little use of motorized vehicles within the WSA is currently being made to manage livestock, few changes in livestock management techniques are expected. The two stock reservoirs could be maintained without concern for wilderness value. No new developments have been proposed within the WSA.

The small herd of wild burros (7 to 10 animals) would continue to use the WSA at present.

VISUAL RESOURCES

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 340 acres of surface disturbance from mineral and energy exploration and development would be degraded. In VRM Class II areas, management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected. In VRM Class III and Class IV areas, management objectives would probably be met and the visual values would not be significantly affected. If roads, vehicular ways, and drill pads are located throughout the area (worst-case analysis), visual quality in the WSA could be significantly reduced. The probability of extensive energy and mineral exploration and development is low.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 340 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown. There are no existing National Register sites within the WSA. Vandalism could become a problem and would increase in proportion to the general population increase.

RECREATION

The entire 59,170 acres would remain open for ORV use as identified in the San Rafael MFP. Approximately 250 visitor days of ORV use could continue along approximately 10 miles of ways and trails. Primitive recreation values would not be enhanced or protected due to the lack of specific management goals. Outstanding recreation opportunities could be foregone due to conflicts created by differing recreational values and user groups. The possible surface disturbance of 340 acres resulting from energy and mineral exploration and development could also reduce the quality of the recreation experience in the area.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 650 current visitor days per year to 969 visitor days at the end of 20 years. Of this amount ORV activity would increase from 250 visitor days to 373 visitor days. The remainder of the projected increase (400 to 596 visitor days) would be attributed to primitive recreation activities discussed above. However, primitive recreational use could eventually decline as vehicular use and other surface-disturbing activities increased.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing San Rafael MFP. Due to the topographic character of the majority of the WSA, primitive recreation values and wilderness qualities have been protected from other resource uses in and around the WSA. Nondesignation of the area might not influ-

ence these values. Those areas not topographically protected, such as drainages and areas below the Reef, would be adversely affected by ORV use.

Surface disturbance is anticipated to be minor; however, the 340 acres of mineral-related surface disturbance could result in a loss of naturalness in the WSA as a whole if roads, vehicular ways, and drill pads are located throughout the area.

Outstanding opportunities for solitude and primitive and unconfined recreation would also be negatively impacted by surface disturbance and increased ORV use in areas of accessibility. Special features (geological, scenic, wildlife, and archaeological values) could also be damaged as well. The potential for energy and mineral development and related disturbance is low in this WSA.

LAND USE PLANS AND CONTROLS

Implementation of this alternative would be consistent with the *Emery County Zoning Plan* which identifies the area as multiple use (mining and grazing zone). The No Action Alternative is based on implementation of the San Rafael MFP and is, therefore, in conformance with it. The No Action Alternative would also be consistent with the State of Utah's plans and policies.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the mineral resources in the WSA were developed, this would not lead to a significant increase in employment and income for Emery County. The probability of economic development of minerals within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials). A portion of the \$100 per year assessment fee required for each mining claim would reach the local economy.

There would be no livestock-related economic losses because the existing grazing use (1,344 AUMs) and the ability to maintain, replace, and build new range improvements would remain as at present.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 319 visitor days per year over the next 20 years and overall recreation-related expenditures average only

\$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 15,640 acres in the WSA open to oil and gas leases that are currently not leased. If leased they would bring up to \$46,920 additional Federal lease fee revenues per year, in addition to new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$1,882 per year) would continue. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (59,170 Acres) (Proposed Action)

As noted in the Description of the Alternatives section, the major change that could occur in the 59,170-acre San Rafael Reef WSA would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 10 miles of existing vehicular ways and trails in the WSA would be closed to vehicular use except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis, it is assumed that existing mining claims would eventually be explored and developed, causing an estimated 140 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas, tar sand, potash, or other leasable minerals would not be allowed. Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas would be smaller than under the No Action Alternative (140 vs. 340 acres), the impacts from development and surface disturbance on air quality, geology, water, vegetation, and forest resources would be insignificant. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

This alternative includes a boundary modification on the east side and an acreage variation to

improve manageability. This variation would follow on-the-ground features which would aid in boundary identification. A total of 3,630 acres were added to the original 55,540 acres of the WSA, for a total of 59,170 acres. Except for mineral and energy resources, the variation would not result in any appreciable differences in environmental impacts. Therefore, the following analysis is equally applicable to both. For simplicity in presentation, the 59,170-acre figure is used. Differences are noted in the Mineral and Energy Resources section.

SOILS

It is estimated that up to 140 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present in the WSA is estimated to be about 0.52 cubic yard/acre/year. Soil loss on disturbed acres has been estimated to be 5.2 cubic yards/acre/year. Therefore, soil loss on the 140 acres would increase from 73 cubic yards/year to 728 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase about 2 percent, from approximately 30,498 cubic yards to 31,153 cubic yards/year.

WATER RESOURCES

Under this alternative, additional reservoirs or expansion of existing sources could not occur to protect watershed values. However, future livestock or wildlife management facilities, such as guzzlers or catchments, could be installed, but would be restricted to preserve wilderness values. Currently there are no plans to build new facilities or improve the two existing reservoirs.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Undiscovered oil and gas resources could not be explored or produced; however, potential of the area is low, with less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas in-place. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated to be recoverable; under this alternative, the potential for recovery would be foregone.

Pre-FLPMA leases (covering 4,920 acres or 8.3 percent of the WSA) could continue to be explored and developed subject to valid existing rights associated with those leases. Post-FLPMA leases (covering 37,330 acres or 63.1 percent of the

WSA) and other leases would be subject to wilderness nonimpairment stipulations. No exploration or development of oil and gas is presently occurring in the WSA. If the existing leases expire without a production show they will not be renewed. Following wilderness designation the land currently available for lease but not under oil and gas lease (15,640 acres) could not be leased.

Due to the small size of the potential deposits, the low certainty that these exist, and the low likelihood of exploration and development (due to low resource potentials or restrictive terrain and occupancy restrictions) it is concluded that this alternative would not result in a significant loss of the oil and gas resource.

In the original 55,540-acre WSA, 3,022 acres are covered by pre-FLPMA leases and 35,598 acres are covered by post-FLPMA leases. Some 15,640 leasable acres are currently unleased for oil and gas and could not be leased in the future.

Tar Sand

The potential for occurrence of tar sand in the WSA is high for small deposits. The probability of development is low. The resource is estimated to be less than 10 million barrels of oil in-place (less than 3 million barrels recoverable). With wilderness designation, the potential for recovery of oil from tar sand in the WSA would be foregone. No competitive leasing in that portion of the San Rafael Swell STSA located in the WSA would be allowed. However, existing categorical management restrictions do not allow surface occupancy and, in some areas, leasing is not allowed. Thus, exploration and development would likely not occur under any alternative.

Potash

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The likelihood of the WSA being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere. The area could not be leased for potash; however, exploration or development would be unlikely even without wilderness designation. It is assumed that there is less than 1 million tons of recoverable potash that would be foregone.

Locatable Minerals

There are 1,006 mining claims covering 11,942 acres (20 percent) of the 59,170-acre WSA (751 claims cover 9,690 acres of the original 55,540-acre WSA). Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations could not

SAN RAFAEL REEF WSA

cause unnecessary or undue degradation of wilderness values. If minerals are located prior to wilderness designation, it is estimated that up to 140 acres could be disturbed due to exploration and development of locatable mineral resources. Claims would be subject to a validity exam and those not current in assessment or not showing a valid discovery would be declared null and void. Only about 60 of the 1,006 claims in the WSA appear to have current assessment. The uranium/vanadium bearing strata are known to occur in the WSA; however, these are felt to be scattered and weakly mineralized. Thus, the possible loss of recovery of this resource would not be significant in terms of values foregone. The potential exists for less than 500 tons of uranium oxide to be foregone.

Manganese (less than 100,000 tons), copper (associated with uranium), and gypsum are three other minerals rated as being low to moderate in potential for occurring in WSA. The gypsum-bearing strata in the WSA is not economical to develop due to transportation costs.

Following wilderness designation, lands not under valid mining claim would be closed to prospecting and development (USDI, BLM, 1981). Because locatable mineral production is not currently occurring and economic considerations are not favorable, it is not likely that exploration or development would occur even without wilderness designation. Therefore, implementation of this alternative would probably not result in any significant loss of recoverable uranium and/or other locatable mineral resources.

WILDLIFE

Wildlife would benefit from a reduction of potential surface-disturbing activities from 340 acres under the No Action Alternative to 140 acres for the All Wilderness Alternative. The acreage within the WSA is important to the continued maintenance of a desert bighorn sheep herd in the area. Wildlife habitat would be protected, including 27,311 acres of high priority habitat and 31,859 acres of limited-value habitat for desert bighorn sheep. Presently, 68 percent (24 animals) of the present population of desert bighorn sheep in the South San Rafael herd unit resides in the WSA and would be protected. Increased recreation use resulting from wilderness designation could have a negative effect on species sensitive to human presence such as desert bighorn sheep.

There are no proposed wildlife management facilities or vegetation treatment projects planned within the WSA. Some would not be allowed if proposed after wilderness designation.

LIVESTOCK AND WILD BURROS

Present domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 1,344 AUMs currently allocated in the 59,170-acre WSA would remain available for cattle and sheep forage. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on managing livestock grazing is expected. The two stock reservoirs would be maintained as in the past, based on practical necessity and reasonableness.

New range developments would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. However, development of future roads or other livestock management facilities could be restricted to preserve wilderness values.

Protection of the wild burros within the WSA would remain the same as under the *Wild Horse and Burro Act* (USDI, BLM, 1971) and the 7 to 10 burros would continue to use the WSA.

VISUAL RESOURCES

Exceptional visual resources in the WSA would be protected because the VRM class would change from II to I. This class generally allows only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities.

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 140 acres of surface disturbance from mineral and energy exploration and development would be degraded. VRM Class I management objectives would probably not be met during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If roads for development of valid mining claims could not be denied (worst-case analysis), VRM Class I objectives might not be met on large portions of the WSA. Because the potential for development of mining claims is low, visual quality would probably not be reduced in the WSA as a whole.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Primitive recreation values would be enhanced, especially since specific management goals would protect the opportunities present. Recreational interest at Goblin Valley State Park could be influenced by a wilderness designation of the surrounding area. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use, estimated at up to 5,554 visitor days per year within the next 20 years. Management provided through a Wilderness Management Plan would provide for control of destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use.

The WSA would be closed to recreational ORV use including approximately 10 miles of ways and trails. ORV use is a popular activity surrounding the WSA and recreationists have been known to ride in portions of the WSA. Exact user numbers are not known; however, field observations and public response indicates annual use to be about 250 visitor days. The 250 visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the vicinity of the WSA. As recreation use increases other commercial operations based on primitive recreational activities could apply for use of the WSA.

ORV use in connection with valid existing rights could continue following designation, as discussed in the Description of the Alternatives section.

WILDERNESS VALUES

Designation and management of all 59,170 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive, unconfined recreation. The special features in the WSA (i.e., geologic, scenic, and wildlife sightseeing) would also be protected and preserved.

Wilderness values such as naturalness would benefit from the reduction of potential surface-disturbing activities. The WSA would be closed to ORV use. Vehicle use associated with livestock

grazing or valid existing rights for mineral use could continue.

Mineral-related surface disturbance could cause a loss of naturalness and outstanding opportunity for solitude within the WSA. Development of existing leases is not likely under this alternative. The anticipated mineral-related surface disturbance would be 140 acres for development of potentially valid mining claims (compared with 340 acres under the No Action Alternative). Mitigation to protect wilderness values would be considered during mining claim development, but road construction and use of motorized equipment could be allowed if there are no reasonable alternatives. There are 11,942 acres (20 percent of the WSA) under mining claims, but potential for mineral development is low. Mineral-related disturbance (including access) could eliminate solitude, naturalness, and the opportunity for primitive and unconfined recreation on the affected areas, but these values would probably not be reduced in the area as a whole. Because the potential for mineral production is low and mitigation would be imposed to protect wilderness values, any loss of these values with wilderness designation would be less likely than under the No Action Alternative. Also, hiking, backpacking, rock scrambling, and other primitive types of recreational activities would probably be more attractive with wilderness designation. Recreational use would be expected to increase about 2 percent per year with growing public awareness of the area.

It is concluded, therefore, that wilderness designation and management of the San Rafael Reef WSA would protect and preserve the wilderness values of naturalness, special features, and opportunities for solitude (outstanding on 58,578 acres) and primitive recreation, except in localized areas affected by the surface disturbance related to mineral exploration. In the area as a whole, however, no significant loss of wilderness values would be expected.

LAND USE PLANS AND CONTROLS

Implementation of this alternative would be compatible with Utah's management of Goblin Valley State Park near the WSA. If affected State land is exchanged as requested by the State for other land outside the WSA, designation would not conflict with the State's policy of maximizing economic return. The existing BLM San Rafael Resource Area MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the MFP. Designation of the WSA as wilderness would only be partially consistent with the *Emery*

County Zoning Plan because most resource uses would continue, although under more restricted conditions. Wilderness designation would conflict with the Plan because oil and gas leases would be phased out and the area would be closed to new mineral location.

SOCIOECONOMICS

Overall there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment

of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$26,880 of livestock sales and \$5,720 of ranchers' return to labor and investment. Future developments for livestock would be foregone along with any resulting increase in ranchers' income. No range developments have been proposed in the WSA.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures (average of \$4.10 per visitor day statewide) could increase from \$2,665 to about \$22,771 for an increase of \$20,106 per year. Motorized recreational use of the WSA, which is estimated at 250 visitor days per year, would be lost. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 42,250 acres now under oil and gas lease would cause an eventual loss of up to \$126,750 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$46,920 annually in Federal revenues from the 15,640 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production could also be foregone.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increases. There are presently no commercial outfitters using the WSA but designation could lead to commercial recreational use in the WSA.

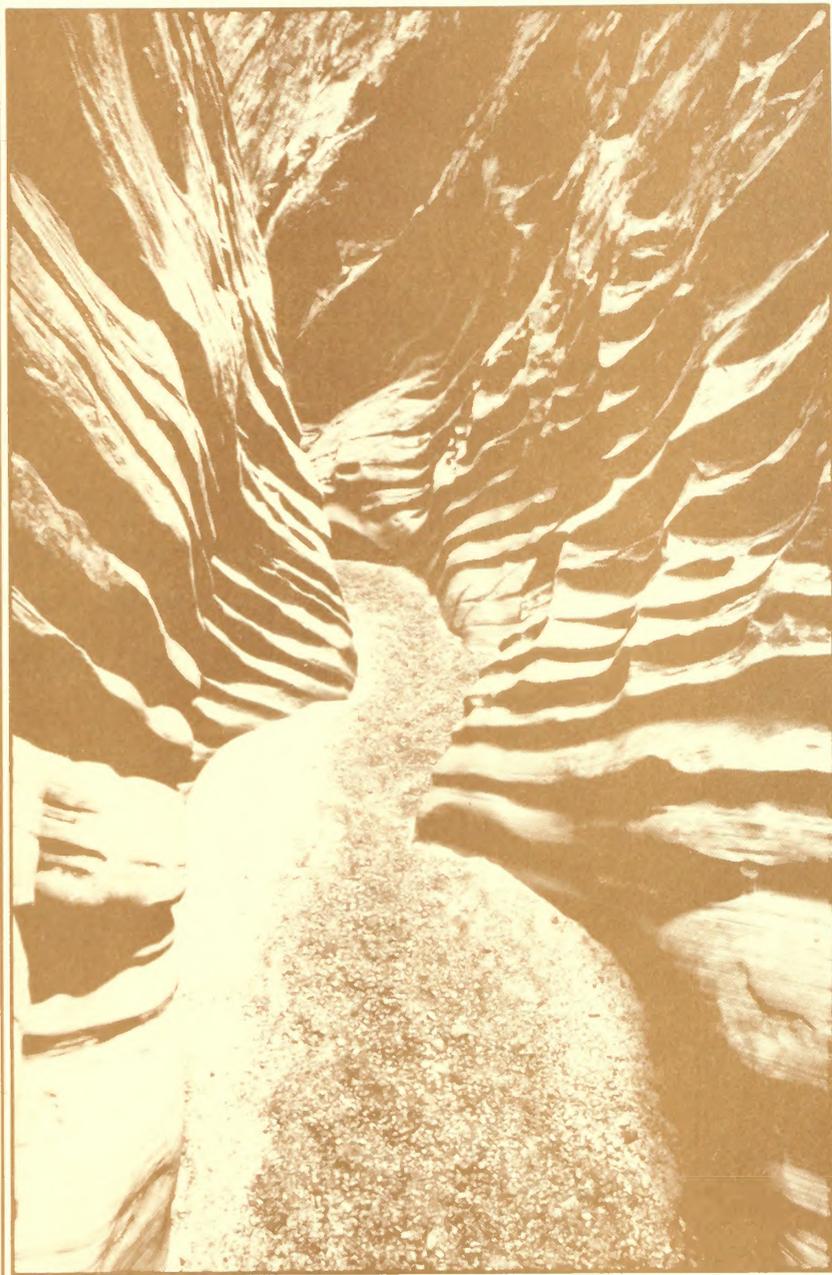
BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David T. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land

SAN RAFAEL REEF WSA

- Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (Map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Crack Canyon WSA



CRACK CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative (Proposed Action)	4
Summary of Environmental Consequences	6
AFFECTED ENVIRONMENT	6
Air Quality	6
Geology	6
Soils	8
Vegetation	8
Water Resources	10
Mineral and Energy Resources	10
Wildlife	14
Forest Resources	15
Livestock and Wild Horses/Burros	15
Visual Resources	15
Cultural Resources	16
Recreation	16
Wilderness Values	16
Land Use Plans and Controls	18
Socioeconomics	18
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	20
Analysis Assumptions and Guidelines for All Alternatives	20
No Action Alternative	20
All Wilderness Alternative (Proposed Action)	23
BIBLIOGRAPHY	29

CRACK CANYON WSA

(UT-060-028A)

INTRODUCTION

General Description of the Area

The Crack Canyon Wilderness Study Area (WSA) is in the San Rafael Swell region of Emery County, Utah. It contains approximately 25,315 acres of BLM-administered land, including portions of the San Rafael Reef, a series of sandstone and shale formations. An additional 20 acres of public land that could be added as a combination of minor boundary modifications on the west end of the WSA is considered as a variation for potential wilderness designation. This variation would increase the size of the WSA to 25,335 acres. The WSA is roughly 16 miles long (northeast to southwest) and between 2 and 3 miles wide (northwest to southeast).

The WSA contains rolling badlands that are a colorful mix of soil, cliffs, and rock monuments. The San Rafael Reef makes up the majority of the Crack Canyon WSA, providing a unique, rugged, and picturesque quality to the terrain. Fins jut from the desert floor, forming a sawtooth ridge of sandstone. Rounded knobs, caves, and arches have been created over time by erosional forces. Elevations in the WSA range from 4,700 to 6,000 feet.

Several major drainages cut through the Reef and are typified by deep, narrow sandstone walls. These drainages have an average depth of 200 feet and are as deep as 500 feet. Some of these canyons have acute pour-offs and narrow twisting routes.

The WSA is situated adjacent to the Goblin Valley State Park of Utah. The nearest towns are Green River (36 air miles) and Hanksville (15 air miles). Crack Canyon WSA is the middle unit of three WSAs that form a half circle around the southern part of the San Rafael Swell. The Muddy Creek WSA is within 1 mile to the northwest and the San Rafael Reef WSA is about 1 mile to the east from the Crack Canyon WSA.

The area is warm and arid to semiarid. Average annual precipitation is 10 to 13 inches in the form of rain, and temperatures range from 10 to 105 degrees Fahrenheit (F). About 8 inches of snow fall between October and April.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the San Rafael Resource Area are discussed in Volume I.

Issues and concerns specific to the Crack Canyon WSA raised in the public scoping process are responded to below:

1. *Comment:* The possible occurrence of the endangered plant species *Sclerocactus wrightiae* and occurrence of the sensitive plant species *Hymenoxys depressa* and *Thelypodopsis (Schoenocrambe) barnebyi* in or near this WSA should be considered in the decisionmaking process.

Response: These two plant species, along with six other candidate, proposed, or listed plant species may occur within the WSA and are discussed in the Vegetation, Affected Environment and Environmental Consequences sections of this document.

2. *Comment:* Uranium/vanadium potential exists, and the effect of wilderness designation on development of these important minerals should be carefully assessed.

Response: The effect of wilderness designation on development of uranium/vanadium is discussed under Mineral and Energy Resources, Environmental Consequences sections.

3. *Comment:* Wilderness designation would protect the Muddy River, which is a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic Rivers System.

Response: The Muddy Creek drainage makes up the southwestern boundary of the Crack Canyon WSA and its protection is discussed under the Affected Environment and Environmental Consequences sections. It is no longer listed for study as a potential addition to the National Wild and Scenic Rivers System (USDI, National Park Service [NPS], 1982).



DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for consideration other than those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (25,335 acres). The All Wilderness Alternative includes 20 acres that have been added for consideration since the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980) decision. This variation would improve manageability by following on-the-ground features, which would aid in boundary identification. The variation would not result in any appreciable differences in environmental impacts from those of the original All Wilderness Alternative; therefore, the analysis is equally applicable to both. For simplicity in presentation, only the larger 25,335-acre figure is used throughout this document.

An additional variation considered and analyzed with the All Wilderness Alternative is a plan that would allow specific management corridors within two canyons to provide continued motorcycle access (about 3.75 miles of wash bottom). Either of these variations could be selected as part of the All Wilderness Alternative.

A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE

Under this alternative, none of the Crack Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the San Rafael Management Framework Plan (USDI, BLM, 1979a). The 640 acres (1 section) of State land within the WSA (refer to Map 1) have not been identified in the MFP for Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership.

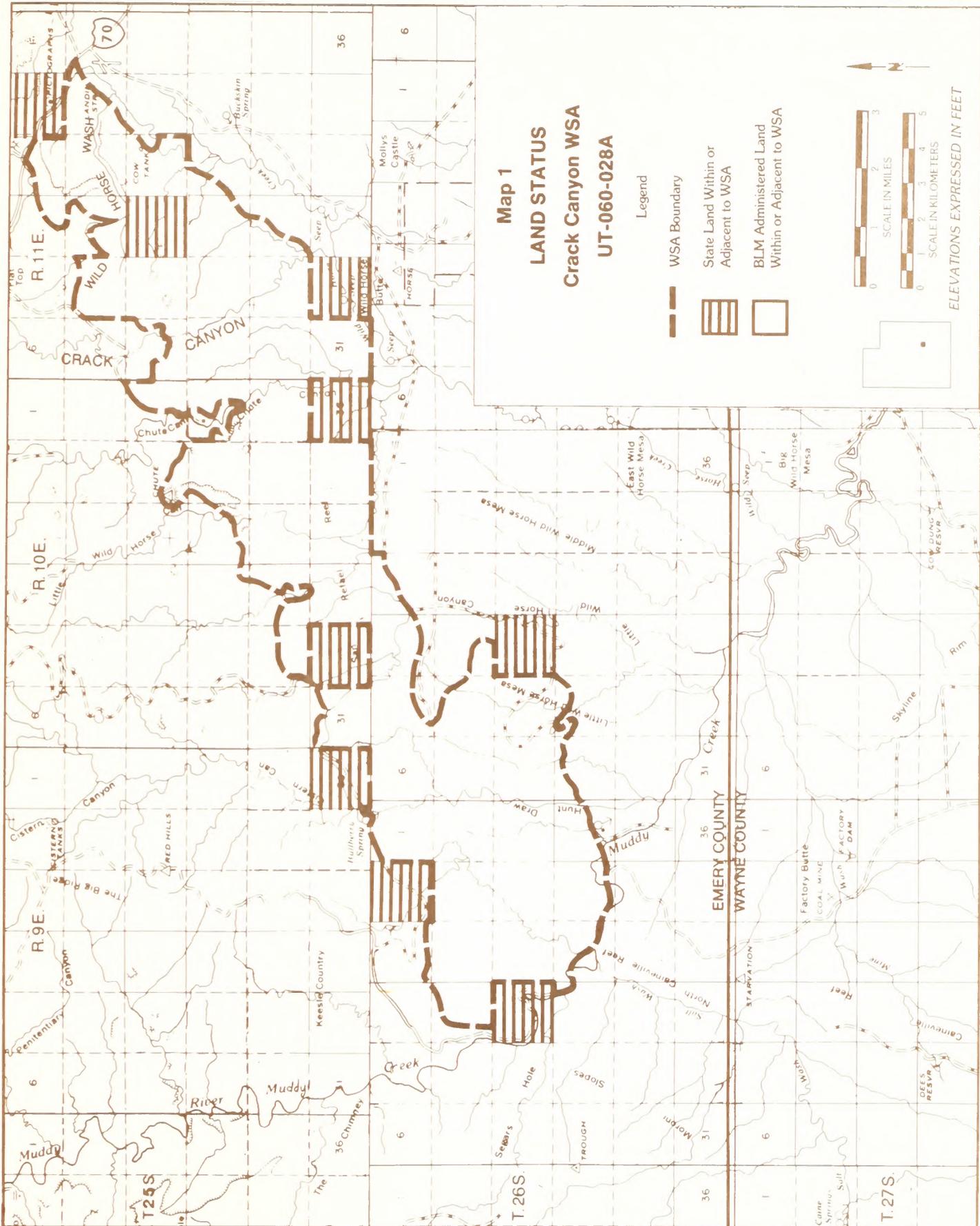
The following are specific actions that would take place under this alternative:

- All 25,335 acres would remain open to mineral location, leasing, and sale. Develop-

ment work, extraction, and patenting would be allowed for the existing 1,748 mining claims on all 25,335 acres and potential future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809) without wilderness considerations. Existing oil and gas leases on 20,195 acres and potential future leases could be developed under Category 1 (standard stipulations) on about 22,155 acres and Category 3 (open with no surface occupancy) on about 3,180 acres.

- The present domestic livestock grazing use of the WSA would continue on five allotments as authorized in the MFP (727 Animal Unit Months [AUMs]). The existing one well, one stock reservoir, and 0.5 mile of fence line could be used and maintained, and new rangeland developments (none are now proposed) could be implemented without wilderness considerations. Use would continue by about 5 to 15 wild horses along the western part of the WSA.
- Developments for wildlife (including potential reintroduction of natural species), watershed, and other resources would be allowed without concern for the wilderness resource if in conformance with the San Rafael MFP and future BLM planning documents. Reintroduction of bighorn sheep would be allowed to augment present populations, if proposed by the Utah Division of Wildlife Resources (UDWR).
- The entire 25,335 acres in the area would be open to off-road vehicles (ORVs). The approximately 2.25 miles of ways and 3.75 miles of travel routes (wash bottoms) through Chute Canyon and Wild Horse Wash inside the WSA and 20 miles of roads that border the WSA would remain available for vehicular use. New access roads could be planned in the future.
- The approximately 1,685 acres of pinyon-juniper woodland would continue to be closed to harvest of firewood and fenceposts as identified in the MFP.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.

CRACK CANYON WSA



CRACK CANYON WSA

- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

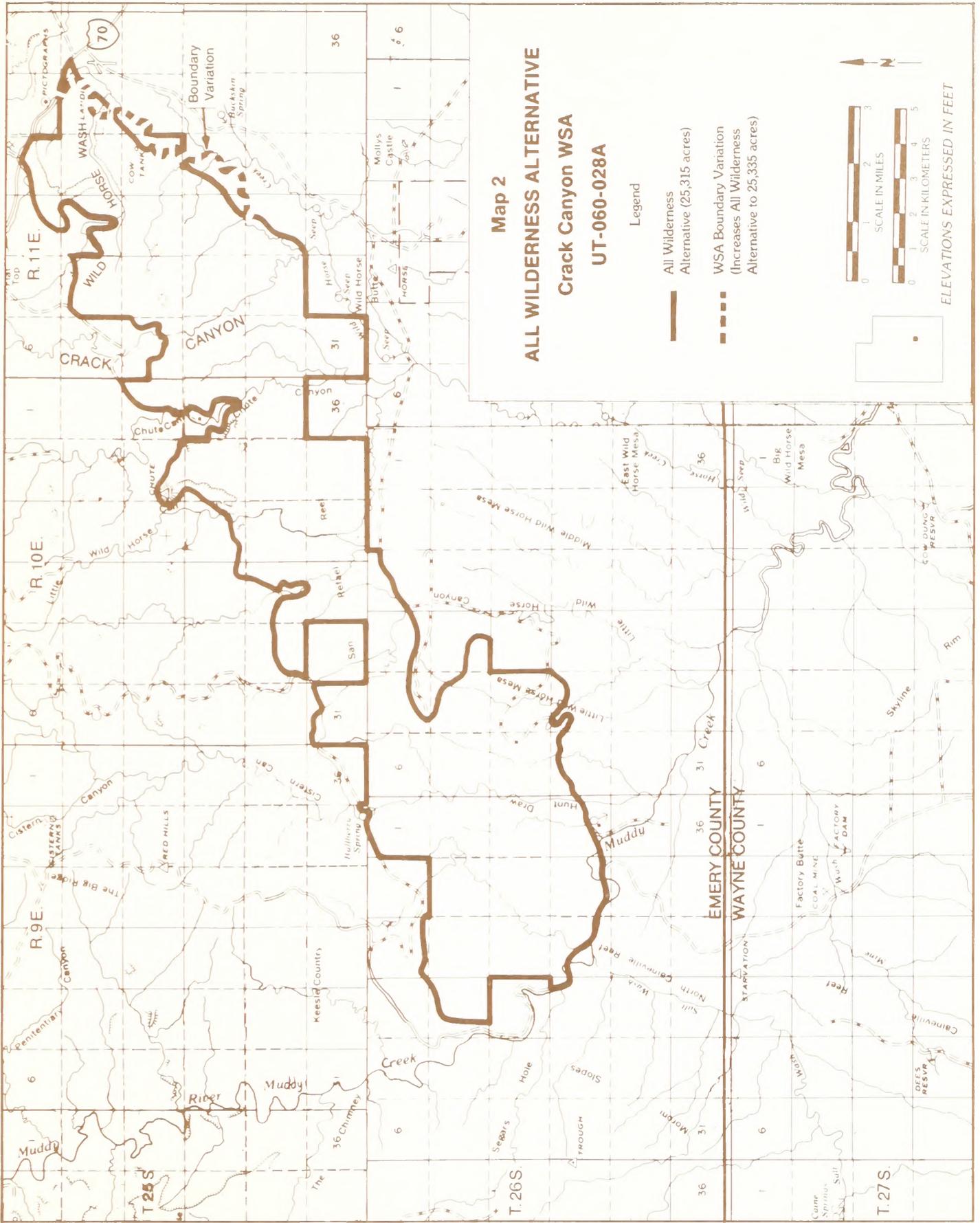
Under this alternative, all 25,335 acres of the Crack Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 1). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, acquisition of one section of State land (approximately 640 acres) within the WSA (refer to Map 1) is likely and would be authorized by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) Two of the eight State sections outside of but adjacent to the WSA would also likely be acquired. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative within the foreseeable future:

- All 25,335 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the 25,335 acres of 1,748 existing mining claims that may be valid. These are primarily uranium claims. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration for wilderness values. Twenty-one existing oil and gas leases involving 20,195 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown.

- Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The 727 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of designation (in this case one well, one stock reservoir and 0.5 mile of fence-line) could continue in the same manner as in the past, based on practical necessity and reasonableness. It is assumed that after designation, the construction of new rangeland developments (none are currently planned) would be allowed if determined necessary for the purposes of resource protection (rangeland and/or wilderness) and the effective management of these resources, if consistent with wilderness protection standards (refer to Appendix 1).
- New water resource facilities or watershed activities (not related to rangeland or wildlife management) would be allowed after designation only if compatible with wilderness values, needed to correct imminent hazards to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964).
- Wildlife transplants and habitat developments would be allowed after designation if compatible with wilderness values. It is assumed that the potential reintroduction of bighorn sheep to increase existing populations would be allowed.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means.
- The entire 25,335-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions or for occasional and short-term vehicular access if approved by BLM for maintenance of approved rangeland developments or water facilities. About 2.25 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 20 miles (or 35 percent) of the WSA boundary follow existing gravel roads that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 25,335-acre wilderness.

CRACK CANYON WSA



As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trail-head parking. This border would be up to 100 feet from the edge of the road travel surface.

- The existing motorcycle trail from Crack Canyon to Wild Horse Wash could continue to be maintained by nonmechanical means and used by hikers and/or horseback riders. Motorcycles would be prohibited.
- Under a variation of the All Wilderness Alternative, travel corridors could be established through Wild Horse Wash and Chute Canyon to allow for continued motorcycle use in these areas (about 3.75 miles of wash bottom). Public comment and field observations indicate heavy and traditional use in these two canyons. The impact analysis addresses both trail closure and travel corridor designation.
- Visual resources on 23,335 acres would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 25,335-acre area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values. Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the 25,335-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to

protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are shown to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

This section briefly describes the affected environment. Unless otherwise indicated, information for this section was taken from the San Rafael Resource Area MFP (USDI, BLM, 1979a) and other BLM technical reports and documents.

Air Quality

The WSA is in a Class II attainment area and currently meets the standards for a Prevention of Significant Deterioration (PSD) Class II air quality classification (1977 Clean Air Act, as amended). The nearest Class I area is Capitol Reef National Park, located approximately 20 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and the Green River-Moab area. A large point source includes two powerplants in the Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles.

Geology

The Crack Canyon WSA is along the southeast-

CRACK CANYON WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES CRACK CANYON WSA

Resource	Alternatives	
	No Action	All Wilderness (25,315 or 25,335 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 750,000 tons of potash, 100,000 tons of manganese, and 50,000 tons of copper. The long-term potential for recovery of 1,000 tons of uranium oxide is high and production has already occurred.	Oil, gas, and potash likely would not be recovered. Assuming a worst-case analysis, the recovery of locatable minerals would also be foregone. Due to the low likelihood of recovery of most of these mineral resources, however, the loss of development opportunity would not be significant, with the possible exception of loss of recoverable uranium.
Wildlife	About 4 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Up to 32 percent of the South San Rafael critical desert bighorn sheep habitat could be lost.	Wildlife would benefit from solitude.
Livestock	Grazing of 727 AUMs and maintenance of existing developments would continue. New developments could be constructed; however, none are now proposed.	Grazing of 727 AUMs and maintenance of existing developments would continue. Little effect on current grazing management is expected. New developments proposed in the future might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 1,000 acres.	Visual quality could be impaired on up to 360 acres.
Recreation	ORV use would continue on 2.25 miles of ways. Overall recreational use could increase from the present 1,500 visitor days per year to 2,235 over the next 20 years. Up to 1,000 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 2.25 miles of ways, would be closed to ORV use. Primitive recreational use could increase to up to 2,532 visitor days over the next 20 years due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 1,000 acres (4 percent of the WSA), which could reduce values throughout the WSA.	Wilderness values would be protected, except on up to 360 acres (about 1.4 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , State of Utah plans and policies, and the current BLM San Rafael MFP.	This alternative would not be consistent with the <i>Emery County Zoning Plan</i> . It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM San Rafael MFP.
Socio-economics	Annual local sales of less than \$70,890 and Federal revenues of up to \$61,603 would continue. An additional \$15,420 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$70,890 and Federal revenues of up to \$1,018 could continue, but Federal revenues of up to \$76,005 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, but increased recreational use over the next 20 years might result in local benefits of up to \$10,381 per year.

CRACK CANYON WSA

ern flank of the San Rafael Swell. During the Eocene Age, the area began to be uplifted, creating a bulge in the existing formations. A period of nondeposition and erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The result of this uplifting was the San Rafael Swell, a breached, doubly plunging anticline that forms a prominent north-trending uplift on the Colorado Plateau. Elevations range from 4,700 to 6,000 feet.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations outcropping in the WSA range from the Triassic Moenkopi Formation (220 million years ago) on the north to the Jurassic Morrison Formation (140 million years ago) on the south.

The Moenkopi Formation, exposed along the backside of the San Rafael Reef (or northwest boundary of the WSA), consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-gray and red shale, and conglomerate. Towards the base of the formation is the Sinbad Limestone Member. The Moenkopi Formation is known as an oil and gas producer in the Grassy Trail Field to the north.

Also exposed along the Reef's north side is the Chinle Formation. This formation consists of sandstone, varigated shale, and conglomerate, all of which are lenticular and intertonguing. The formation is a uranium producer and composed of four members: Temple Mountain, Monitor Butte, Mossback, and Church Rock.

The Wingate Formation lines the cliff faces of the Reef's north side. It consists of buff, orange, and brown, massive cross-bedded, medium-grained sandstone and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow-colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls. The Navajo Sandstone makes up the greatest percentage of the WSA.

The Carmel Formation is exposed on the eastern and southeastern sections of the WSA. It consists

of brown to gray sandy limestone, red, thin-bedded sandstone and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

In the region of the WSA known as Broken Rainbow Valley is a southern running band of three formations. These are the Entrada Sandstone, Curtis, and Summerville Formations. The Entrada consists of red-brown, massive sandstone in its upper part and thin-bedded sandstone and red shale in the lower part. The Curtis Formation consists of red-brown to green-gray, thick-bedded sandstone, green-gray conglomerate, and maroon shale. The Summerville Formation is comprised of red-brown sandstone, maroon mudstone, and dark-brown mudstone with green-white sandstone, limestone, and gypsum. This area is often referred to as the Badlands.

The Morrison Formation, located in the southernmost portion of the WSA, is uranium-bearing and may contain dinosaur remains. The formation is composed of two members: the upper Brushy Basin and the lower Salt Wash. The Brushy Basin Member is composed of variegated red, purple, gray, and gray-green siltstone, mudstone, claystone, and shale with minor amounts of sandstone and conglomerate. The Salt Wash Member consists of gray, tan, white, and yellow-brown sandstone and mudstone. Limestone and shale can be interbedded with the mudstone. Lenses of conglomerate occur in the upper portions of the member.

Soils

The WSA contains five general soil mapping groups with overall soil characteristics as shown in Table 2. Although wind may be an erosive agent, especially on the sandy soils at the base of the San Rafael Reef, water is the primary agent of erosion in the WSA. Vegetation offers fair ground cover, except on the Reef where the exposed bedrock resists erosion. Precipitation is light, but it tends to occur in short, intense summer thunderstorms that can dislodge and transport a great deal of soil. Estimated erosion is shown on Table 3. Natural erosion is considered to be relatively high at an average of 4.2 cubic yards/acre/year in the Crack Canyon WSA.

Vegetation

The dominant type of vegetation in the WSA is desert shrub-saltbush. The saltbush vegetation type is found at the lower elevations and is associated with saline and/or alkaline soils. Poor

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	35	8,880	0.0	0
Badland	15	3,797	20.0	20
Shallow to deep silty and clayey soils on moderately steep dissected structural benches. Some of these soils are affected by gypsum and salt.	20	5,063	5.0	20
Shallow loamy soils on sloping structural benches.	25	6,329	1.0	5
Very deep loamy and sandy soils on nearly level valley floors.	5	1,266	0.1	1
Totals	100	25,335		

Source: Hansen, 1985.

drainage conditions coupled with low precipitation result in accumulations of soil salts in these lowlands, significantly affecting plant growth. Dominant species are shadscale, Castle Valley clover, mat saltbush, and fourwing saltbush.

Desert shrub is another type of vegetation occurring in the WSA. It is found in areas characterized by low precipitation, high temperatures, and rapid evaporation. It is found on gravelly benches and gently sloping sandy lowlands, in soils that are mostly shallow and rocky. Semidesert shrubs belonging to the Chenopodiaceae and Compositae families dominate the desert shrub vegetation type. Major shrubs are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandy muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell area, including wavy-leaf oak, sand sagebrush, and purple sage.

The pinyon-juniper vegetation is found on foothills and mesas and other areas of relatively high elevation and precipitation in the area. Soils are typically shallow and rocky. The pinyon-juniper type stops at lower elevations due to low precipitation, high temperatures, and salty substrata. Major species are pinyon pine and Utah juniper.

The barren designation is applied to areas where there is no vegetation or practically none, such as cliff faces and rocky slopes.

There are no riparian vegetation areas within the WSA. The Muddy Creek makes up the southern boundary; however, it is not considered to have riparian vegetation characteristics.

Table 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	15	3,797	75,940	35	8,860	177,200
High	10.0	0	0	0	0	0	0
Medium	5.0	20	5,063	25,315	25	6,329	31,645
Low	1.0	25	6,329	6,329	5	1,266	1,266
Very Low	0.1	5	1,266	1,266	0	0	0
None	0.0	35	8,880	0	35	8,880	0
Totals		100	25,335	1107,710	100	25,335	1210,111

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 4.2 under present conditions; 8.3 if disturbed.

CRACK CANYON WSA

Five candidate species under review for threatened or endangered status by the U.S. Fish and Wildlife Service (FWS) (*Hymenoxys depressa*, *Pediocactus despanii*, *Spaeralcea psoraloides*, *Schoenocrambe barnebyi*, and *Psoralthamnus polyadenius* var. *jonesii*), one proposed endangered (*Cycladenia humilis* var. *jonesii*), and two listed endangered plant species (*Erigeron maguirei* var. *maguirei* and *Schlerocactus wrightiae*) are found near or within the WSA).

Vegetation types in the Crack Canyon WSA are shown in Table 4.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Barren	12,120	48
Desert shrub-saltbush	11,410	45
Desert shrub	120	(0.47) 0
Pinyon-juniper/ Desert shrub	1,685	7
Total	25,335	100

Source: USDI, BLM, 1979a.

The Crack Canyon WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types in the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Saltbush-greasewood	17,721	70
Galletta-threawn shrub steppe	7,614	30
Total	25,335	100

Source: USDI, Geological Survey, 1978.

Water Resources

About 2.5 miles of Muddy Creek, located along the southeast corner of the unit, is the major perennial water source. All other streams in the

WSA are intermittent or ephemeral. Cow Tanks, an unnamed spring, and Bullberry Spring are also considered year-round sources of water. There are also an undetermined number of small, unmapped water holes along the crest of the San Rafael Reef.

Water use in the unit is primarily by wildlife and domestic livestock. The only developed water source within the WSA is a stock reservoir located near the southern boundary at Little Wild Horse Mesa.

It is believed that all the water in the WSA is suitable for livestock, wildlife, and possibly human consumption. Irrigated agriculture in the upstream reaches of Muddy Creek may create some problems with taste, solids, nutrients, and coliform bacteria in that stream. No specific water quality data are available.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

The potential for mineral resources is relatively high. An overall importance rating (OIR) of 3+ was assigned to the Crack Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The overall importance rating applies to 75 to 100 percent of the tract evaluated by SAI. The rating was based primarily on the favorable presence of uranium, although the demand for this material is low and will probably remain so for many years. The energy and mineral resource rating summary is given in Table 6.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

CRACK CANYON WSA

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c4	Less than 10 million barrels
Uranium/ Vanadium	f4	c4	Greater than 1,000 tons of uranium oxide
Coal	f1	c2	Small tonnages
Potash	f2	c2	Less than 1 million tons
Geothermal	f2	c1	Low temperature
Hydropower	f1	c4	None
Copper	f2	c2	Less than 50,000 tons
Manganese	f2	c1	100,000 tons of 40-percent manganese

Source: SAI, 1982³.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³SAI did not rate gypsum; however, BLM has added text information.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA contains deposits of vanadium and could contain copper and manganese that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

LEASABLE MINERALS

There are no existing mineral leases in the WSA other than for oil and gas. Other leasable minerals produced regionally include potash and coal. Tar sand has also become a recent production interest and could be leased in a combined hydrocarbon lease that would also include oil and gas.

There are currently 21 existing oil and gas leases covering approximately 80 percent (20,195 acres) of the WSA. Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before

wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

There are 6,240 acres under pre-FLPMA leases and 13,955 acres under post-FLPMA leases.

The WSA is included in the "Price District Oil and Gas Categories Environmental Analysis Report" (USDI, BLM, 1975). The results establish oil and gas categories and these are included in Table 7.

TABLE 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	22,155	87
2. Open with special stipulations	0	0
3. Open with no surface occupancy	3,180	13
4. No leasing	0	0
Total	25,335	100

Source: USDI, BLM, 1975.

These leasing categories also apply to tar sand.

The SAI favorability rating indicates that a low potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. Less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas are estimated to be recoverable. Positive evidence of resource occurrence is some distance away from the tract or in a situation that may be considered unrelated to the geology of the WSA.

In order to have an oil and gas field, certain conditions must be met. These conditions include

CRACK CANYON WSA

a source for petroleum, porous and permeable rock (reservoir rock), and traps. Traps can be either stratigraphic, structural, or a combination of both. Structural traps are caused by folding, faulting, fracturing, and intrusions of salt plugs.

The San Rafael Swell is a structural trap. The interior of the Swell has been eroded away, probably allowing any petroleum contained in the structure to escape. The Swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the Swell. The Ferron Gas Field, 38 miles northwest of the WSA, is an anticlinal structure trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance Gas Field, 18 miles to the west, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail Field, 54 miles to the north, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 3 miles to the northwest. The well was plugged and abandoned on February 1, 1959. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Crack Canyon WSA would probably be small pools and/or fields. Traps occurring in the WSA could be either stratigraphic or structural (due to small faults). The WSA is probably too far from the center of the Swell to contain much, if any, petroleum within the older (Mississippian, etc.) formations because the petroleum collects in the apex of anticlines. This, however, does not rule out traps due to faulting.

Tar Sand

A small tar sand deposit is reported to occur in the western part of the WSA. Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving behind the heavy fraction, or tar substance. The Moenkopi Formation is the main tar sand-bearing formation. The nearest deposit of Moenkopi to the WSA is in the Chute Canyon deposit, located just outside the north-eastern boundary and is estimated to contain 50 to 60 million barrels of oil in-place. The Torrey

Member of the Moenkopi Formation is the tar sand-bearing unit. The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of asphaltic material (tar sand).

The San Rafael Swell Special Tar Sand Area (STSA) was designated in 1982 by the Department of the Interior, and about 630 acres (2 percent of the northwestern portion of the WSA) are within the STSA. The San Rafael Swell STSA is estimated to contain 445 to 545 million barrels of oil in-place.

The SAI favorability rating for tar sand indicates a low to moderate potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. It is unlikely the tar sand within the WSA would be developed due to small-sized deposits and economic factors.

Coal

The WSA is considered geologically unfavorable for coal. Cretaceous coal-bearing strata either never were deposited or have been eroded away. The SAI favorability rating for coal indicates there is no deposit.

Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousand feet thick in the area of Moab where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating indicates that, if deposits occur in the Crack Canyon WSA, they generally would contain less than 1 million tons of potash. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it likely that the potash resource in the WSA would not be developed.

Hydropower

A survey of potential hydropower sites in Utah indicated that no potential sites have been identified in or near the WSA. On the basis of that information SAI rated the WSA as having no hydropower potential.

Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal water (between 20 de-

CRACK CANYON WSA

degrees Centigrade [C] and 90 degrees C). Water extracted at these temperatures can be used for direct heating purposes. It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and the lack of nearby potential users. SAI rated the potential as low.

LOCATABLE MINERALS

There are 1,748 mining claims located in the WSA. They cover the entire 25,335 acres of the WSA. None of these claims have been patented. Of the 1,748 claims, 502 appear to have current assessment. These 502 claims cover approximately 4,780 acres and total 19 percent of the WSA.

Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These are scattered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock Members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member. Production of uranium from mines and prospects along the WSA's northern boundary is small. Adjacent to the extreme western boundary of the WSA is the Delta Mine. Tunnel workings of that mine extend under the WSA approximately 0.3 mile. The Delta Mine produced 827,248 pounds of uranium oxide from 1952 to 1973. Other mines adjacent to the northwestern boundary of the WSA produced over 55,000 tons of ore also in the 1950s to the 1970s.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these other minerals occurs in sufficient grades or quantities within the WSA to be minable. These metals indicate a hypothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The southern uranium belt, which extends through the WSA, is most favorable for the occurrence of ore deposits. Moderate- and large-size ore bodies are found in the southern belt (Hawley, et al., 1968). The large ore body of the Delta Mine, located in the southern belt and adjacent to the WSA, occurs in a sandstone lens of the Monitor

Butte Member. The ore body is enclosed in red, purple, and pale-green mudstone and attains a maximum thickness of 20 feet. The main ore minerals are uranite and carnotite, believed to be deposited by solutions that traveled laterally along bedding plane fractures until the sandstone lens was reached. The ore grade is relatively rich (greater than 1 percent uranium oxide).

The ore-bearing solutions responsible for the deposition of the Delta ore body could have deposited similar ore bodies in the immediate vicinity.

The collapse structures present at Temple Mountain (outside the northwestern end of the WSA) are not present in the WSA. Thus, the high potential of the Temple Mountain District does not extend into the WSA. Also, the potential for uranium in the Morrison Formation within the southeastern part of the WSA is relatively unknown. The formation consists of two members (Salt Wash and Brushy Basin) and ore deposits in these formations are chiefly tabular or lenticular, occurring in the Channel sands of the Salt Wash Member. The ore was deposited when the ore-bearing solution entered a reducing environment. Ore bodies in this formation are also expected to be scattered, but could be slightly larger (up to 20,000 tons).

The overburden in the north portion of the WSA is thin and increases in thickness to the southeast. The probability of finding ore bodies decreases as this overburden increases. Difficulty of discovery combined with increasing recovery costs is the main reason for decreasing probability of development. Most of the surface deposits have been discovered, leaving subsurface deposits that require extensive drilling for development.

Associated with uranium may be vanadium, copper, and silver. Vanadium is the only critical mineral produced from the San Rafael Swell and has occurred in relation to uranium development.

Due to numerous uranium mines and their occurrence near the northwestern boundary of the WSA, plus the fact that the southern part of the Swell is considered favorable for large ore bodies, SAI rated the tract with a high potential for a large tonnage of ore (greater than 1,000 tons of uranium oxide). The certainty that uranium and vanadium occur in the WSA is high.

Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville Formations. The nearest known deposits are 26 miles northeast of the WSA. The

CRACK CANYON WSA

host formations occur in the southern part of the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the SAI low favorability rating indicates a deposit size of up to 100,000 tons of 40-percent manganese.

Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is the Copper Globe Mine located about 1 mile south of the Devils Canyon WSA (approximately 17 miles northwest of the Crack Canyon WSA). The mine produced 2 or 3 tons of copper ore between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The SAI favorability rating indicates a low potential for copper deposits in the WSA and, if found, deposits would be small in tonnage (less than 50,000 tons of contained copper).

Gypsum

The Summerville Formation is reported to contain a bed of industrial grade gypsum in the southern portion of the WSA. The BLM has given gypsum a favorability rating indicating a moderate potential of occurrence. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million tons). It is unlikely that any gypsum would be developed due to distance of mines to the market and related transportation concerns.

Salable Minerals

Although the potential exists for use of rock materials from the WSA, it is considered low due to limited demand and high availability elsewhere in more accessible locations.

Wildlife

The Crack Canyon WSA provides habitat for a limited variety of wildlife species. Except for Muddy Creek and several springs, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock water holes are a good source of water following rains, but they cannot be relied upon by wildlife due to drying out during drought periods. During the winter, snow (when available) can provide water. Vegetation is also limited due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer. Desert bighorn sheep were sighted along the San Rafael Reef during the 1960s. A sighting was recorded adjacent to the WSA's northwestern border in 1983. Pronghorn antelope occur to the east and may utilize the

WSA. A bull buffalo was sighted adjacent to the WSA in 1982.

The WSA provides habitat for coyote, bobcat, cottontail rabbit, blacktail jackrabbit, woodrat, ringtail, badger, Ord kangaroo rat, gray fox, kit fox, white-tail antelope squirrel, chipmunk, rock squirrel, bat, mice, and vole.

Habitat for various small bird species is found within the WSA. The species diversity and population sizes are small due to the lack of a diverse habitat. The San Rafael Reef, along with various cliffs and canyons, provide many nesting, roosting, and foraging opportunities for avian fauna. Few individual raptors are found in the WSA. Of those present, golden eagle (BLM sensitive species), prairie falcon, American kestrel, red-tailed hawk, ferruginous hawk (candidate species under status review by FWS), and rough-legged hawk (winter residents) are the most common. Waterfowl and shorebirds could exist in the WSA where Muddy Creek borders the unit, although occurrences would be rare. Chukars are found in the WSA and are dependent upon available water. Mourning dove are also found in this WSA.

Several species of snakes and lizards could be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snake, striped whipsnake, and western rattlesnake account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Mountain lion may occasionally visit the area, but with low deer numbers, they would be a rare occurrence. No documented sightings are recorded. Muddy Creek flows along the southwest border of the WSA. This portion of Muddy Creek has been classified by UDWR as a limited value (lowest rating), nongame fishery, Class V stream. Speckled dace, flannelmouth sucker, bluehead or green sucker, and round-tail chub are found in this portion of the Muddy Creek. Tadpole shrimp (crustaceans) may be present in the various potholes.

The peregrine falcon (an endangered species) is thought to be a possible visitor to the WSA. No known sightings exist. Bald eagle may be found along the Muddy Creek searching for food in the winter. No known sightings have occurred in the WSA, but there is potential.

UDWR and BLM have designated all 25,335 acres in the WSA as high-priority desert bighorn sheep habitat. Lambing and rutting grounds, along with

CRACK CANYON WSA

water sources, are considered critical habitat. Currently, the WSA provides habitat for about 32 percent of the desert bighorn sheep in the south San Rafael herd.

There are no existing or potential wildlife facilities or treated vegetation projects within the WSA.

Forest Resources

The dominant forest type is juniper-pinyon woodland (1,685 acres), found in sparse quantity within the WSA. This forest type is used commercially throughout the Southwest for firewood, fenceposts, and Christmas trees. Because of the remoteness from populated areas and availability of the products closer to population centers, the BLM does not allow any of these uses in the WSA. The area would yield 3,370 cords of a juniper-pinyon type product if favorable variables (i.e., slope, access, etc.) were present.

Livestock and Wild Horses/Burros

The Crack Canyon WSA contains a portion of five livestock grazing allotments. Grazing was authorized in all allotments prior to the passage of the Federal Land Policy and Management Act (FLPMA).

Table 8 gives livestock grazing use data for this WSA.

Range development projects in the WSA are limited to one 0.50-mile fence, one stock reservoir, and one well. There are no known plans for additional grazing improvements within the WSA.

Wild horses have been seen along the western portion of the WSA and within several of the area's main canyon drainages. Herd numbers range from 5 to 15 horses.

Visual Resources

The most dramatic and outstanding visual feature of the Crack Canyon WSA is the San Rafael Reef. The Reef rises out of the desert floor with rock formations jutting 2,000 feet into the sky. The huge sawtooth ridge of upturned sandstone is cut by spectacular canyons. There are few scenes within the Reef that do not involve a panoramic view into a deeply cut canyon, an enclosed view dominated by a vertical red sandstone wall, or a tremendous rock protrusion.

Near the southern end of the WSA a small valley is formed between the San Rafael Reef and a low ridge lying southeast of the Reef. From the crest, this ridgeline and valley, known as Broken Rainbow Valley, provide a picturesque view. It is a colorful area of purples, reds, yellows, greens, whites, blacks, browns, and blues. Interesting shapes are formed by erosion in the soils and rocks of the valley. The southern area is known as the Badlands.

The north and west boundaries of the WSA consist of sheer cliff faces of the Reef's backside. Golden, rust, and red colored pinnacles and sandstone figures provide additional visual variety to this area where several drainages have cut their way through the rugged character of the San Rafael Reef.

**Table 8
Livestock Grazing Use Data**

Allotment	Class of Livestock	Number of Operators	Season of Use	Total AUMs ¹	Total Acres ¹	Percent of		Percent of
						Allotment in WSA	AUMs in WSA	Total Allotment AUMs in WSA
Iron Wash	Cattle	1	03/01 to 12/31	4,980	126,870	6	299	6
McKay Flat	Cattle	1	11/01 to 04/15	2,288	50,352	3	69	3
Rock Springs	Cattle	1	11/01 to 05/31	4,414	89,767	0	1	0
Temple Mountain	Cattle	1	10/16 to 04/15	618	14,796	1	68	11
Wild Horse	Cattle	1	12/01 to 06/30	1,067	58,501	30	290	27
Total		5					727	

Source: USDI, BLM, 1979a.

¹These are totals for the allotment on Federal lands. The WSA incorporates only a portion of this allotment.

CRACK CANYON WSA

Elevations in the WSA range from 4,500 feet in the badlands region to over 6,000 feet atop the jugged fins of the Reef.

The WSA is classified as having Class A scenery, containing the most outstanding characteristics of the physiographic region. The entire area has been rated high for its sensitivity level. The high level is based on the visual qualities seen from Utah Highway 24. Based on these factors the entire WSA is within the VRM Class II management area.

Cultural Resources

No cultural inventory has been made of the area; however, three sites have been reported. These sites are: a rock shelter with structural remains and two rock art sites. These sites have not been evaluated for significance, nor have they been nominated or listed on the National Register.

Due to other occurrences of sites found along the San Rafael Reef, it is believed that the many drainages in the WSA could contain other archaeological sites.

Recreation

The majority of recreational use occurs along the eastern boundary of the WSA and in several drainages cutting through the San Rafael Reef.

The main recreational activities known to occur within the WSA are hiking, backpacking, cultural exploration, and educational events. Motorcycle riding and ORV use are two popular activities in the area surrounding the WSA, and recreationists have been known to traverse through or ride in portions of the WSA. The majority of the ORV use occurs during the spring months and is usually concentrated on the Easter and Memorial Day weekends. There are no known public use facilities within the WSA. The Goblin Valley State Park is located 2 miles southeast of the WSA. The Park includes 15 camping sites, a restroom, and a ranger home station. Recreationists use the desert and Goblin Valley State Park, east of the WSA, as camping areas. The exact number of ORV riders using the WSA is unknown; however, public motorcycling interest in the area has been relatively high and use is estimated at over 1,000 visitor days per year. The most popular motorcycling areas in the WSA are Chute Canyon, Wild Horse Wash, and a trail between Crack Canyon and Wild Horse Wash. The San Rafael MFP indicates that the area is designated as open to ORV use.

There are no recreational facilities within the WSA. Several foot trails exist within drainages, but are normally washed away during flooding.

Adjacent to the WSA (south) is the Goblin Valley State Park (a recreational fee area). Fifteen camping sites, a restroom, foot trails, and a ranger station are present. The Park emphasizes recreational use of the San Rafael Swell and the Crack Canyon WSA with printed material, slide shows, and brochures. Much of this information caters to the ORV user. In 1982, Goblin Valley State Park had approximately 20,000 visitors. About 4,000 of those were during the Easter weekend. It also was estimated that 3,000 additional recreationists used the surrounding area (including the WSA) at Easter.

With the adjacent State Park and easy access via the Park's roadway and roads surrounding the area, Crack Canyon WSA offers the recreationist a variety of experiences such as hiking, backpacking, rock scrambling, and exploration of narrow and twisting canyons.

The intricate canyon system of the WSA provides a variety of loop trips, both easy and challenging. Various pools, arches, and slickrock gardens add to the interesting visual character of the area.

The WSA is used frequently by educational and commercial hiking groups. Three educational and commercial outfitters presently use the WSA. The Muddy Creek drainage forms the southwestern boundary of the WSA and is also used by recreationists. Muddy Creek previously was among those being considered in the National Wild and Scenic Rivers Inventory; however, it no longer is included (USDI, NPS, 1982). The main activities taking place there are hiking, floating, and some ORV use. Total hiking and other recreational use in the WSA (except ORV) is estimated at over 500 visitor days per year. This estimation is based on BLM field observations and public contact. Total recreation use in the Crack Canyon WSA (including ORV use) is estimated at 1,500 visitor days annually.

Wilderness Values

SIZE

The WSA (25,335 acres) is of sufficient size to enhance the wilderness values present.

NATURALNESS

The major imprints surrounding the Crack Canyon WSA have been excluded during the *BLM Intensive Wilderness Inventory* (USDI, BLM,

CRACK CANYON WSA

1980). What remains of note is one 0.50-mile fence, approximately 2.25 miles of ways, a stock reservoir, and two wells. These imprints occurred after 1976, unless otherwise noted.

The 0.50-mile fence is located near Chute Canyon wash, along the southern boundary of the WSA. The fence is used for livestock operation.

Ways, totaling approximately 2.25 miles, are located near Hunt Draw, Muddy Creek, and between Wild Horse Wash and Crack Canyon. The most common use of these ways is motor-cycling, although some four-wheel vehicular traffic may occur. Flooding and erosional processes are slowly eliminating these imprints. Motorcycle use, however, on the way between Crack and Wild Horse Canyons has developed a distinct trail that is approximately 3 to 4 feet in width.

A stock reservoir, once used for livestock purposes, is located near the southern boundary of the WSA. The reservoir is situated near Muddy Creek and only provides a source of water after thundershowers, usually during the driest periods of the summer when Muddy Creek is nearly dry.

A water well, located along the southern border near Muddy Creek, is also used periodically by livestock. This imprint, in addition to those listed above, are substantially unnoticeable in character, thus not detracting from the area's naturalness. Another well developed by Union Carbide is located adjacent to the northern boundary near Temple Mountain. The well was drilled in the 1950s, and is also substantially unnoticeable in character.

These imprints cover a total of about 506 acres (2 percent of the WSA). The remaining 24,829 acres could be considered pristine. The entire 25,335 acres meet the naturalness criterion for areas under wilderness review.

SOLITUDE

The WSA offers outstanding opportunities for solitude. The many incised drainages through the San Rafael Reef offer passages for the user to experience seclusion and isolation. The twisting character of the canyons and up to 1,000-foot cliffs effectively shroud lines of sight and suppress sounds for any substantial distance within these canyons. Offsite intrusions and influences are essentially nonexistent within the canyons.

The higher reaches of the WSA, consisting of sandstone knobs, solidified dunes, and the San Rafael Reef's jugged fins, are intermittently open and provide great vantage points of the surrounding desert to the east, badlands of Robber's

Roost to the south, and the inner drainage system of the San Rafael Swell to the north-northwest. Vegetation cover is limited and does not effectively screen visitors. The rolling terrain and immense topographic character, however, do allow for separation and the feeling of seclusion. With an expansive view of the surroundings, a user can experience the feeling of remoteness. From specific points within the WSA, several dirt roads, traffic on U-24 (8 miles east), and Goblin Valley State Park may be seen outside the unit, but these outside elements do not necessarily intrude upon the visitor's solitude. Their observation may actually, as a comparison, emphasize the remoteness of the recreational experience within the WSA. During the Easter and Memorial Day weekends, when ORV use adjacent to the WSA is the greatest, the sense of reclusiveness may be less than outstanding. Also, motorcycle use occurring within two specific canyons of the WSA has a negative effect on solitude when the two types of recreation activities are combined in the same place.

In over 99 percent of this WSA (25,300 acres), the opportunities for solitude are considered outstanding during most of the year.

PRIMITIVE AND UNCONFINED RECREATION

Three educational and commercial outfitters are already using the WSA as an outstanding environmental and recreational experience. Their trips involve hiking and backpacking the intricate canyon drainages through the Reef. Historic, pre-historic, and geologic qualities found in the area are observed and studied. Survival techniques are taught and the explorers are given the chance to know themselves and to reach beyond their self-imposed limits.

During the spring and early fall holidays many recreationists flock to the desert to enjoy the warm weather. ORV use is their main recreational activity, and many use the area adjacent to the WSA. Due to the restrictive character of the topography in the majority of the WSA, many of these recreationists explore the area by foot. Outstanding opportunities for hiking, backpacking, rock scrambling, photography and art, and scenic viewing await these explorers.

Muddy Creek is used for innertubing (floater must negotiate rapids) during the early spring when high water is present. During the Creek's drier periods, the drainage is used for hiking and motorcycling. The Muddy Creek drainage is the southwestern boundary of the WSA.

After rain storms, many isolated pools of water provide an element of surprise and contrast to the

CRACK CANYON WSA

dry, desolate character of the WSA. The dramatic nature of the Reef's formation with its sheer-walled cliffs, pinnacles, knobs, twisted canyons, valleys of color, and prehistoric remnants all contribute to a high quality recreational experience.

A combination of several outstanding recreation opportunities allows the entire WSA (25,335 acres) to meet the outstanding criterion set for areas under wilderness review.

SPECIAL FEATURES

The Crack Canyon WSA offers four supplemental features of geologic, scenic, wildlife, and archaeological values. These features enhance the other opportunities available within the unit.

The canyons of this WSA offer many exposed geologic strata and formations, including arches, caves, and narrow, twisted and textured passages. The upper reaches provide dramatic views of the San Rafael Reef and its many fins and folds. This WSA (25,335 acres) has unique features found only along the San Rafael Reef.

Archaeologically, the WSA possesses few known qualities. Although only three archaeological sites have been recorded, these are represented by small pictograph or petroglyph panels and small habitations in rock shelters.

Considerable evidence of old mining activity surrounds the north, west, and south boundaries of the WSA. Shacks, cabins, and mine shafts are located adjacent to the WSA, providing striking contrast to the color, beauty, and magnitude of the surrounding land.

In 1983 a group of bighorn sheep was spotted adjacent to the WSA's northwestern border. Bighorn sheep were known to occupy the area before mining activities occurred.

Land Use Plans and Controls

There is one State of Utah owned section of land within the WSA (640 acres). All other lands within the WSA are public lands with both surface and mineral estates managed by BLM. There are eight sections of State-owned lands adjacent to the WSA.

There are no recreational or other withdrawals or valid rights-of-way within or adjacent to the WSA.

Physical and legal access to the WSA is provided by Emery County roads encompassing the eastern, southern, northern, and a portion of the western boundaries of the WSA.

There are no contiguous lands under consideration by other agencies for wilderness.

The area is identified for multiple-use management by BLM. It is managed under provisions of the San Rafael MFP.

In the *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing).

Socioeconomics

DEMOGRAPHICS

The WSA is located in southern Emery County. Activity related to this WSA is significant primarily to Emery County, with a minor concern to Carbon County, and the town of Hanksville, Utah in Wayne County. Emery County had a population of 12,900 in 1982, not quite 1 percent of the State population (University of Utah, Bureau of Economic and Business Research, 1982). Most of the population occurs in Castle Valley, the northwestern part of the county. There are two service centers in northwestern Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316). Other towns in Castle Valley are Elmo (1980 population of 300), Cleveland (1980 population of 522), Orangeville (1980 population of 1,309), Ferron (1980 population of 1,718), and Emery (1980 population of 372). The Town of Green River is located in the southeastern part of the county and had a 1980 population of 1,282 (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

Wayne County had a 1982 population of 2,050. Most of the county's population is in scattered, small communities in the western part of the county (USDC, Bureau of the Census, 1981). Hanksville and the surrounding area had a 1980 population of 351 and is the only community located in eastern Wayne County.

Emery County contains 4,449 square miles of land. About 82 percent of the county is owned by the Federal Government, 11 percent by the State, and 7 percent by private residents.

EMPLOYMENT

Statistics (refer to Table 9) indicate that almost half of the income earned in Emery County and about 40 percent of the employment is from mining, mostly coal. Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important

TABLE 9
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate	1	1
Services	2	6
Other	-	-
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

sources of employment and income. Agriculture accounts for 0.6 percent of the county income and less than 1 percent of the total employment.

During 1970 to 1980, Emery County experienced the largest percentage change in population, increasing by 123 percent (5,137 to 11,451). This increase was brought about by construction of the powerplants mentioned before and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at various times during the county's history.

Unlike the rest of Emery County, Green River has not grown in the past 30 years. Major employment includes mining, government, agriculture, and tourism. Recent uranium mine layoffs have significantly increased unemployment in the area. Because the community's population has remained relatively stable over the past 30 years,

its infrastructure has required only minor adjustments, and problems associated with population growth have not occurred.

Hanksville has few services; those available include several gas stations, a general store, a motel, and a restaurant. Major local employment includes government, mining, and agriculture. Most mining jobs are located outside Wayne County. Recent layoffs (1982) in the uranium industry have had a significant impact on the community, and local unemployment rates are high.

INCOME AND REVENUES

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and dispersed recreation.

In the past, production from mines and prospects within and adjacent to the WSA have brought significant income and employment to residents of the area (approximately 2,500 work years of employment). The WSA has 502 mining claims that appear current in assessment work. Regulations require a \$100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Five livestock operators have grazing privileges in the Crack Canyon WSA. Based on the consumption of 727 AUMs of forage by cattle, it is estimated that the WSA accounts for \$14,540 of livestock sales, including \$3,635 of ranchers' returns to labor and investment.

The WSA supports some private (both motorized and nonmotorized) and some intermittent commercial use. Recreation-related expenditures are low and could only be significant to the commercial outfitters who occasionally use the area. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the WSA is estimated as about 1,500 visitor days per year resulting in a total estimated expenditure of \$6,150 annually. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Emery County.

The WSA generates revenues to the Federal Treasury from two sources: grazing and mineral leasing. Within the WSA, about 20,195 acres are currently leased for oil and gas. At \$3 per acre,

this generates about \$60,585 annually. Half of this, or about \$30,292, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 727 AUMs of forage consumed by livestock in the WSA and a grazing fee of \$1.40, the WSA annually accounts for \$1,018 of grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM district for the construction of range improvement projects.

Table 10 summarizes local sales and Federal revenues related to the Crack Canyon WSA.

TABLE 10
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$60,585
Mining Claim Assessment	Up to \$50,200	None
Livestock Grazing	Up to \$14,540	\$1,018
Recreational Use	\$6,150	None
Total	Up to \$70,890	Less than \$61,603

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as noted in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation

would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development; however, even though the area would be open to resource use and development without controls for wilderness protection, it is likely that little overall development of mineral resources would occur within the foreseeable future. This would be due to the rough and restrictive terrain, low potential for an oil and gas resource, previous exploration and development of locatable minerals along outcrops outside and adjacent to the WSA, and the low economic situation for uranium and tar sand.

The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium/vanadium, 40 acres; manganese, 320 acres; potash, 40 acres; and tar sand, 440 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

Significant impacts to air quality would not occur because major developments with the No Action Alternatives are unlikely. Disturbance of 1,000 acres would result in increases in fugitive dust emissions, although control efforts would be expected to minimize wind blown dust conditions. Other than the possibility of tar sand development no major sources of air pollutant emissions are proposed in the vicinity of the WSA. If tar sand

were developed (low probability), air quality could deteriorate up to the Class II limitations depending on the type of extraction process and degree of on-site processing.

GEOLOGY

Few impacts to geology are expected because surface disturbances associated with locatable minerals (e.g., uranium/vanadium) and leasable mineral exploration and development activities would probably not exceed 1,000 acres, and major alteration of geologic features would not occur. Some subsidence and fracturing of formations related to tar sand extraction could occur on portions of the 630 acres in the San Rafael Swell STSA.

SOILS

It is estimated that up to 1,000 acres of soil and rock could be disturbed by mineral exploration and development. The average annual rate of soil loss would increase 1,000 acres from 4.2 to 8.3 cubic yards/acre/year; therefore, the soil loss on the 1,000 acres would increase from 4,200 cubic yards/year to 8,300 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 4,100 cubic yards/year (3.8 percent) over current annual soil loss of 107,710 cubic yards.

VEGETATION

The anticipated maximum of 1,000 acres disturbed would not significantly impact the sparse vegetation of the Crack Canyon WSA. Five candidate, one proposed endangered, and two endangered plant species occur near or within the WSA. The location, pattern, and distribution of surface disturbance within the WSA are unknown, but site-specific clearances would be conducted prior to any authorized surface-disturbing activity and avoidance of these plants would be required. If these species could be affected, the BLM would consult with the FWS as required by BLM policy (refer to Appendix 4). The BLM would request a biological opinion when appropriate as required by the Endangered Species Act. Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of the plant populations would be preserved under the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water

quality. Surface disturbance from mineral and energy exploration and development could impact 1,000 acres under this alternative, with a soil loss increase of approximately 4,100 cubic yards per year. If this occurred at the west end of the WSA, increased turbidity could occur in Muddy Creek; otherwise, there would be little impact to water resources due to the lack of perennial streams in the WSA. No water developments or improvements have been identified for the WSA, and water resources development opportunities would continue to be minimal. Extraction of tar sand would result in degradation of ground water quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same (22,155 acres in Category 1, and 3,180 acres in Category 3) as identified in the San Rafael MFP. The wilderness stipulations on 13,955 acres of post-FLPMA leases would be removed, and there would be an additional 5,140 acres available for lease (Categories 1 and 3).

The WSA is considered low in potential for oil and gas occurrences with less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas considered recoverable. These oil and gas resources could be explored and developed without concern for wilderness restrictions. However, due to the anticipated small size of the deposits and rough terrain, little or no development is expected under this alternative.

Tar Sand

The tar sand resource (630 acres) in the Crack Canyon WSA could be explored and potentially developed in the future, without wilderness constraints. About 3,000,000 of the 10,000,000 barrels in-place could be recovered. However, since other larger or more accessible deposits are available in Utah, it is unlikely that the tar sand within the WSA will be developed due to the predicted small-sized deposits. Although the potential exists for tar sand development in the San Rafael Swell STSA, it is considered to have limited development potential (USDI, BLM, 1984b).

Potash

The entire WSA would be open to potash leasing. Approximately 750,000 tons of potash could be recovered. The likelihood of the area being explored or developed is remote due to thick, rich, and more shallow deposits elsewhere.

Geothermal

Due to low water temperatures and distance from potential users, no development of geothermal resources is anticipated; however, with this alternative, leases could be issued without wilderness considerations.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of greater than 1,000 tons of uranium oxide, 100,000 tons of 40-percent manganese, and less than 50,000 tons of copper could be developed. Due to the current market conditions, locatable minerals in the WSA are not expected to be mined within the near future; however, with this alternative they would be available for recovery without wilderness limitations should market conditions change. The probability of uranium extraction is greater than for copper or manganese extraction.

WILDLIFE

With this alternative, wildlife could be adversely affected by surface-disturbing activities on up to 1,000 acres. This would include high-priority habitat for desert bighorn sheep. Lambing and rutting grounds along with water sources are considered critical habitat. If surface disturbance were to occur within the critical habitat areas, up to 32 percent of the south San Rafael desert bighorn sheep herd could be lost. Future increases in ORV use in the vicinity of bighorn sheep lambing or wildlife watering areas would have a negative effect on wildlife.

The 1,000 acres of disturbance would have adverse impacts to other wildlife, particularly if the limited watering places were affected. Since wildlife populations in the WSA are currently at rather low levels, disturbance would not affect large numbers of animals; however, changes in vegetation, cover, and water could impact the few individuals present.

If use of the area by the peregrine falcon is confirmed and disturbance is proposed that could affect this species, BLM would initiate Section 7 consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect candidate, proposed, or sensitive species, it can be reasonably concluded that the viability of populations of endangered, candidate, or sensitive species would be preserved under the No Action Alternative.

There are no plans within the WSA for wildlife

management facilities or vegetation projects; therefore, the limited habitat potential would remain as at present.

FOREST RESOURCES

There is a limited source of trees, but occasional firewood use by campers and hikers would continue to occur in the area. Even with 1,000 acres of surface-disturbing activities there would be no significant effect on forest resources because few trees would be affected.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 727 AUMs currently allocated within five allotments are used by the livestock of five ranchers. Since very little use of motorized vehicles is currently being made to manage livestock, little effect on livestock management is expected. The one well, one stock reservoir, and 0.5 mile of fence line could be maintained without concern for wilderness values. No new rangeland improvements have been identified and increases in livestock use are not anticipated.

The two small herds of wild horses (approximately 10 to 15 animals) would continue use of the WSA as at present.

VISUAL RESOURCES

Due to the low probability of extensive mineral development, significant impacts to visual resources are not expected under this alternative; however, potential surface disturbance within the WSA could be up to approximately 1,000 acres. The VRM Class II management and actions would tend to minimize visual contrasts created by intrusions; however, in localized areas, Class II objectives might not be met. Some short-term visual impacts would be expected. The worst-case analysis indicates that long-term impacts to visual resources could occur if numerous roads are constructed throughout the area to provide access to valid mining claims. Road construction scars in rocky areas would be very difficult to reclaim and blend with natural visual conditions.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 1,000 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in disturbed areas. There are no known National Register sites within the WSA.

RECREATION

The entire 25,335 acres would remain as a proposed open area for ORV use as identified in the San Rafael Resource Area MFP. About 3.75 miles in two canyon washes and approximately 2.25 miles of ways receive traditional ORV (motorcycle) use of about 1,000 visitor days/year.

Primitive recreation values would be foregone in those areas where ORV use or surface-disturbing activities (1,000 acres) took place. The future trends in recreational use of the Crack Canyon WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 1,500 current visitor days/year to 2,235 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 500 visitor days/year to about 745 visitor days/year over the next 20 years. Likewise, recreational activities utilizing vehicular access (primarily motorcycling) would increase from about 1,000 to 1,490 visitor days/year.

Since Muddy Creek is no longer under consideration in the National Wild and Scenic River Inventory, potential nomination would not be affected by this alternative.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing San Rafael MFP. Due to the topographic character of the majority of the WSA, primitive recreation values and wilderness qualities have been protected from other resource uses in and around the WSA. Many of these wilderness values would probably remain even without wilderness designation due to the rugged rock formations that curtail access. Tracks from motorcycle travel on 3.75 miles of wash bottoms would continue to be periodically removed by thunderstorm run-off. Those areas not topographically protected, such as drainages, areas below the Reef, and Broken Rainbow Valley, could be adversely affected. The 2.25-mile motorcycle way between Crack Canyon and Wild Horse Wash would remain and could become enlarged by continued use.

Impacts from locatable mineral extraction on valid mining claims would have the greatest potential to affect wilderness values in the WSA as a

whole. Expected mineral and energy exploration and development could disturb an estimated 1,000 acres. Within the expected disturbed acreage, the outstanding opportunities for solitude and primitive and unconfined recreation would be foregone. These outstanding opportunities exist throughout the WSA, with recreation activities that include hiking, backpacking, rock scrambling, and scenic observations.

The quality of supplemental geologic, scenic, wildlife, and archaeologic values could be reduced by the projected surface disturbance.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Emery County Zoning Plan*, which identifies the area as a potential mining and grazing zone. The No Action Alternative would also be consistent with the State of Utah's plans and policies. The existing San Rafael MFP does not recommend wilderness designation; therefore, this alternative would be consistent with the existing BLM land use planning document.

SOCIOECONOMICS

With this alternative, no changes are expected in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected. Domestic livestock grazing (727 AUMs) would continue as authorized in the San Rafael MFP. The \$60,585 per year in Federal oil and gas lease revenues generated within the WSA could continue and could be increased by as much as \$15,420 with additional leasing of 5,140 acres.

The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, as noted previously, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained.

Local expenditures related to recreation would continue and could increase from \$6,150 to \$9,164, for a net increase of \$3,014. Overall, the local economic impact would be considered insignificant.

All Wilderness Alternative (25,335 acres) (Proposed Action)

As described in the Description of the Alternatives section, major changes that could occur in the 25,335-acre area would be related to its withdrawal from mineral location, closure to new mineral leasing and sale, and closure to ORV (primarily motorcycle) use. This alternative also

includes a minor boundary adjustment of about 20 acres (25,315 or 25,335 acres), and the possible establishment of travel corridors through Wild Horse Wash and Chute Canyon to allow for continued motorcycle use in these areas (3.75 miles of wash bottom). The remaining 2.25 miles of existing vehicular ways in the WSA would be closed to vehicular use except for approvals by BLM. The entire area would be placed in leasing Category 4 (closed to leasing). The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed, causing an estimated 360 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas, tar sand or potash and other leasable minerals would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA).

Because potentially disturbed areas would be smaller than under the No Action Alternative (360 vs. 1,000 acres), the impacts from development and surface disturbance on air quality, geology, vegetation and forest resources would be insignificant for the All Wilderness Alternative, as described for the No Action Alternative. The variation in the boundary would not result in any appreciable differences in environmental impacts from those to be discussed; therefore, the analysis below is equally applicable to both the original WSA and the WSA with 20 additional acres. For simplicity in presentation, however, only the larger figure of 25,335 acres is used in the discussion. ORV trail closure and travel corridor designation will be analyzed under the Wildlife, Recreation, and Wilderness Values sections due to the specific influence on these resources only.

SOILS

The soil resources could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Soil loss on disturbed areas would increase from 4.2 cubic yards/year to 8.3 cubic yards/year. On 360 acres, this would result in an annual soil loss increase from 1,512 to 2,988 cubic yards. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 1,476 cubic yards (1.4 percent).

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 360 acres under this alternative. This disturbance could be scattered through most of the WSA, although it could be less along the rocky outcrops of the San Rafael Reef due to terrain limitations. Because of the small, scattered areas affected and the lack of surface water resources, there would be no significant change from the current water resources situation.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Wilderness designation of the Crack Canyon WSA would have an impact on exploration for oil and gas. Pre-FLPMA leases on 6,240 acres could be explored and developed under prior existing rights. Post-FLPMA leases covering 13,955 acres would be subject to wilderness stipulations. In addition, 5,140 acres available for leasing would not be leased, as the WSA would be closed to new leasing. As previously noted, it is anticipated that all existing leases would expire prior to oil or gas production. Undiscovered oil and gas resources could not be explored or produced; however, potential of the area is considered low, with less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas estimated to be recoverable. These resources would be foregone.

It is concluded that impacts would not be significant due to the small size of potential deposits, the low certainty that these exist, and the low likelihood of development even without wilderness designation.

Tar Sand

The potential for the occurrence of tar sand within the WSA is low to moderate for small deposits. Less than 10 million barrels of oil in-place exist, and of that only 3 million barrels are considered recoverable. The 630 acres of the WSA in the San Rafael Swell STSA could not be leased. Any tar sand in that area would be foregone. Since development is unlikely due to small-sized deposits, scarcity of water, and economic factors, impacts to tar sand as a result of wilderness designation would not be significant.

Potash

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The

likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere. It is assumed that there could be up to 750,000 tons of recoverable potash that would be foregone; however, this would not be significant due to availability of potash from other sources.

Geothermal

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

Locatable Minerals

There are 1,748 mining claims covering 25,335 acres (100 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void. Only 502 of the 1,748 claims in the WSA appear to have current assessment.

The uranium/vanadium-bearing strata is known to occur in the WSA. Even though the WSA has a high potential for large tonnages of uranium/vanadium the individual ore bodies are thought to be small to moderate in size, scattered, and, in the eastern and southeastern portions, are covered by a great amount of overburden.

If minerals are located prior to wilderness designation, it is estimated that up to 360 acres could be disturbed due to exploration and development of the locatable mineral resources, primarily uranium and manganese. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case, the potential for recovery of more than 1,000 tons of uranium, less than 50,000 tons of copper, and 100,000 tons of 40-percent manganese would be foregone. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981). Because production of these minerals is not currently occurring and economic considerations are unfavorable, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Therefore, this alternative would probably not result in any significant short-term loss of recoverable uranium and associated mineral resources. However, in the long term, loss of uranium recovery could be important.

WILDLIFE

Wildlife would benefit from prevention of an estimated 640 acres of surface-disturbing activities, but could be adversely impacted by 360 acres of potential disturbance. The acreage within the WSA is extremely important for the continued existence of desert bighorn sheep in the area. Except for the estimated 360 acres, high priority and potential critical habitat would be protected for the desert bighorn sheep. Presently, 32 percent of the desert bighorn sheep population of the South San Rafael Herd Unit resides in the WSA. Any disturbance to potential critical habitats (lambing areas and watering areas) could cause a reduction in this population. Wilderness designation would minimize the chance that this would occur.

There are no proposed wildlife management facilities nor vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 360 acres of disturbed area.

Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife population. Mining claim development projected for 360 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA.

A variation to the All Wilderness Alternative would designate travel corridors within Chute Canyon and Wild Horse Wash for the continued use by traditional motorcyclists. This variation would have a negative impact on wildlife species and their habitat, especially if use were to increase and occur within critical lambing and water areas.

LIVESTOCK AND WILD HORSES

Present domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 727 AUMs currently allocated in the WSA would remain available for cattle forage. Within the area recommended as wilderness, the rangeland improvement of one well, one stock reservoir, and 0.5 mile of fenceline would be maintained as in the past, based on practical necessity and reasonableness.

New rangeland improvements would be allowed if wilderness criteria were met and if such new facilities were determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources, although none are proposed. Therefore, wilder-

ness designation would have no impact on the level of livestock use.

Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing management is expected.

The wild horses within the WSA would benefit from additional protection from disturbance by mineral and energy extraction and ORV use.

VISUAL RESOURCES

With wilderness designation a slight benefit would occur to the exceptional visual resources of the Crack Canyon WSA because the VRM designation would change from Class II to the more restrictive Class I. Class I generally provides for only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities. Some short-term visual impacts would be expected from up to 360 acres of valid mining claim activities; however, not to the degree of significantly degrading the entire WSA.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

The entire 25,335 acres would be closed to recreational ORV use. Over 1,000 visitor days per year of traditional ORV (motorcycle) use would be lost. Most of this use occurs along 3.75 miles of wash bottoms within Chute Canyon, Wild Horse Wash, and along 2.25 miles of a way between Crack Canyon and Wild Horse Wash (for a total of 5.0 miles of travel). Similar areas found in other parts of the San Rafael Resource Area are not proposed to be designated closed to ORVs; therefore, this ORV use could be transferred to other locations without significant affect on visitation to Emery or Wayne Counties. The one adverse impact to existing motorcyclists would be loss of the unique Crack Canyon area and the convenience of riding from Goblin Valley State Park that they now enjoy.

Primitive recreation values could be enhanced, especially by the All Wilderness Alternative. By increasing public awareness of the area, designation could result in increased primitive recreational use of the WSA. Judging from the WSA's site characteristics, population distribution about the site, and availability of similar sites, use would

increase from the present 1,500 to an estimated 2,532 visitor days/year. The nature of the use would change from about 33 percent primitive use and 67 percent ORV use to 100 percent primitive recreation use.

Mineral-related surface disturbance on up to 360 acres could cause localized impairment of primitive recreational values in the WSA.

It is concluded that this alternative would have a negative impact on traditional ORV recreation use within the WSA (5.0 miles of existing motorcycle travel routes and greater than 1,000 ORV visitor days foregone). However, the alternative could benefit the outstanding primitive recreation opportunities by preventing the likelihood of 640 acres of surface-disturbing mineral activities and eliminating ORV conflicts. Increased recognition would be given to specific primitive recreational values.

A variation to the All Wilderness Alternative would designate two travel corridors within Chute Canyon and Wild Horse Wash to allow the continuation of motorcycle travel only within the wash bottom. No other mechanical operation would be allowed. This variation would eliminate most of the negative impacts to traditional ORV users (greater than 1,000 visitor days per year).

Conflicts between ORV recreationists and primitive recreation users could result because of this variation. The two canyons are narrow and restrictive in terms of access. Recreationists enter these at either the western side of the WSA or the eastern side, where the canyons open to the desert. The rugged character of the San Rafael Reef, through which these canyons cut, creates sheer cliffs and walls towering 200 to 1,000 feet high. Thus, both activities would be restricted to the canyon drainages. During times of high use by ORVs, the primitive types of recreation activities within these canyons would not occur because users would be displaced to other areas in the WSA, or possibly away from the area entirely. Noise created from motorcycle operation within the narrow, constricted drainages could also negatively affect primitive recreation opportunities and solitude for up to 2 miles, depending on terrain characteristics, weather, and wind directions. In many places, the WSA is only 2 miles wide. Thus, noise impacts could be significant in relation to the size of the area. An estimated 33 percent of the predicted 2,532 visitor days of primitive recreation could be negatively impacted by this variation of the All Wilderness Alternative.

WILDERNESS VALUES

Designation and management of all 25,335 acres

CRACK CANYON WSA

as wilderness would ensure the preservation of the wilderness values of size, naturalness, and outstanding opportunities for solitude and primitive and unconfined recreation throughout the entire area. The special features in the WSA (i.e., geologic, scenic, wildlife, and archaeological values) would also be protected and preserved.

The 25,335 acres would be closed to ORVs. Motorcycle riding primarily takes place surrounding and within specific areas of the WSA. Tracks within these areas would reclaim over time as they do after flooding of the drainages. Some vehicle use could continue if related to special grazing and mineral rights.

Wilderness values would benefit from the prevention of 640 acres of surface-disturbing activities, but still could be affected somewhat by potential disturbance of 360 acres. There are pre-FLPMA claims that, if valid, would have prior and existing rights to impair wilderness values. Although the impact analysis assumes that 360 acres could be disturbed due to mining claim activities, the probability for this to occur in the foreseeable future is considered low.

Data indicate that the potential for oil and gas is low, and the potential for lease development is unlikely. Therefore, it is expected that existing leases would expire. Since no new leasing would occur, there would be no impact on wilderness values.

Outstanding opportunities for solitude and primitive and unconfined recreation, where present, would be preserved. These opportunities exist throughout the WSA's 25,335 acres. Hiking, backpacking, rock scrambling, and other primitive types of recreational activities would probably be more attractive under wilderness designation, and use is expected to increase (as noted in the Recreation analysis above) with growing public awareness of the area.

Supplemental geologic, scenic, wildlife, and archaeological values would be protected within the 25,335 acres. There is a low probability that an increase in recreational use could cause an increase in cultural resource vandalism or artifact removal and possibly have an occasional negative impact on wildlife species.

Thus, it is concluded that wilderness designation and management of the WSA would protect and preserve the wilderness values of naturalness, special features, and outstanding opportunities for solitude and primitive and unconfined recreation (25,335 acres), except where surface disturbance resulting from mineral exploration would occur.

A variation to the All Wilderness Alternative designating travel corridors within two canyon drainages (Chute Canyon and Wild Horse Wash) would have a negative effect on wilderness values as a result of conflicts between types of recreation uses. The conflicts would be as discussed in the Recreation section of this alternative. The variation to the All Wilderness Alternative would have a negative impact on outstanding solitude and primitive opportunities, and this would tend to compromise the full wilderness potential of the area.

LAND USE PLANS AND CONTROLS

Wilderness designation would not conflict with the *Emery County Zoning Plan* for livestock grazing, but closure to mineral leasing and mining claim location would not be consistent with the Plan. The alternative would not conflict with State plans for in-held lands if the 640 acres of State land in the WSA and 640 acres adjacent to the WSA were exchanged for other lands outside the WSA. Management plans for Goblin Valley State Park on adjacent lands would be compatible.

The existing BLM San Rafael MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the BLM land use plan.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding mineral exploration and development would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low in the foreseeable future, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims or income associated with possible mining in the distant future would be lost.

Livestock use and ranchers' income would continue as at present with \$14,540 annually of livestock sales and \$3,635 of ranchers' returns to labor and investment. Federal grazing fee revenues of about \$1,018 would continue (at \$1.40 per AUM).

CRACK CANYON WSA

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide), but could increase from \$6,150 to about \$10,381, for a net increase of \$4,231 per year.

Except for commercial outfitters, these expenditures would be well distributed among businesses in the affected area and would be locally insignificant. By increasing public awareness, designation could also increase the demand for commercial outfitter services and result in a more regular commercial use of the WSA.

The elimination of recreational ORV (motorcycle) use in the Crack Canyon WSA would reduce related expenditures. Although these expendi-

tures would be locally insignificant, they probably would exceed any gain from increased nonmotorized use. Some of these ORV expenditures might not be lost if the use transfers to other nearby areas in the region.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 20,195 acres now leased would cause an eventual loss of \$60,585 per year (at \$3 per acre) to the Federal Treasury. The loss of 5,140 acres potentially available for lease would cause a potential loss of \$15,420 per year to the Federal Treasury because new leasing would be foregone. In each case, the State would have received half of these revenues, and none of this money would likely flow back to the local economy.

It is concluded that the local economic impact of this alternative would be insignificant.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Milton, Bob. 1982. "Comparison of Uses in Proposed and Existing Wilderness Areas" (unpublished document). January 1982. U.S. Department of the Interior, Bureau of Land Management, Moab District Office, Moab, Utah.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.

CRACK CANYON WSA

- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January, 1982. U.S. Government Printing Office, Washington D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan, 1980 SCORP*. Salt Lake City, Utah. p. 157.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Muddy Creek
WSA



MUDDY CREEK WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative (Proposed Action)	2
Summary of Environmental Consequences	6
AFFECTED ENVIRONMENT	6
Air Quality	6
Geology	6
Soils	8
Vegetation	8
Water Resources	9
Mineral and Energy Resources	10
Wildlife	13
Forest Resources	14
Livestock and Wild Horses/Burros	14
Visual Resources	14
Cultural Resources	15
Recreation	15
Wilderness Values	16
Land Use Plans and Controls	17
Socioeconomics	17
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	19
Analysis Assumptions and Guidelines for All Alternatives	19
No Action Alternative	19
All Wilderness Alternative (Proposed Action)	22
BIBLIOGRAPHY	27

MUDDY CREEK WSA (UT-060-007)

INTRODUCTION

General Description of the Area

The Muddy Creek Wilderness Study Area (WSA) is in the San Rafael Swell region of Emery County, Utah. It is situated 8 miles south of Interstate 70 (I-70) and 12 miles northeast of Capitol Reef National Park. The nearest towns to the north are Emery (30 road miles) and Ferron (42 road miles). The WSA has approximately 31,400 acres of BLM-administered land, including portions of Muddy Creek and its major drainage system. In size, the WSA is roughly 10 miles north to south and between 3 and 6 miles east to west.

The WSA's topography can be divided into three categories: deep-cut drainages, river-canyon bottoms, and stair-stepped mesas.

The canyons of Muddy Creek, The Chute, The Chimney, Hebes Canyon, and Willow Springs Wash are deeply entrenched into the Slaughter Slopes and Hondo Country. They vary in depth from 5,000 feet elevation along their wash bottoms to nearly 7,000 feet elevation atop their rims. The canyons are steep and rugged, being accessible from the higher country in only a few spots.

The Muddy Creek drainage is only moderately vegetated, mainly with pinyon-juniper and desert shrubs in the upper meandering portions of the canyon. Some side canyons are spotted with vegetation, small pour-offs and pools, and mostly shaded by steep walls.

The southern portion of the WSA consists of deep-red, stair-stepped mesas called Keesle Country. The Pasture forms another mesa scene and both are interrupted by the narrow, deep, and twisting character of Muddy Creek as it flows through The Chute.

The climate in this area is cold desert with temperatures ranging from 15 degrees to 100 degrees Fahrenheit (F). Precipitation averages about 8 to 10 inches, with approximately 15 inches of snow between October and April.

The west end of Crack Canyon WSA is located within 1 mile of the southeast border of Muddy Creek WSA.

Specific Issues Identified in Scoping

General issues pertaining to more than the WSA are discussed in Volume I. Issues and concerns

specific to the Muddy Creek WSA were identified through the public scoping process and are responded to below.

1. *Comment:* Uranium/vanadium potential and development would affect wilderness values and potential designation.

Response: The impacts of mineral development on wilderness values are discussed in the Environmental Consequences, All Wilderness Alternative section. The WSA has a high potential for uranium, which could generate impacts to wilderness values on about 6,000 acres of existing mining claims.

2. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate to high. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

3. *Comment:* The EIS should discuss land use conflicts as a result of wilderness designation.

Response: The Affected Environmental and Environmental Consequences, Land Use Plans and Controls sections, identifies and discusses any conflicts with land use plans.



DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for consideration other than those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (31,400 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE

Under this alternative, none of the 31,400-acre Muddy Creek WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS) (refer to Map 1). The area would continue to be managed in accordance with the San Rafael Management Framework Plan (MFP) and the future San Rafael Resource Management Plan (RMP) scheduled for completion in 1988. The 640 acres of State land in the WSA are analyzed as remaining under State ownership.

The following are specific actions that would take place under this alternative:

- All 31,400 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on existing mining claims (6,000 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Existing oil and gas leases on 1,600 acres and potential future leases could be explored and developed. Future leases could be issued under Category 1 (standard stipulations) on about 640 acres, Category 2 on 200 acres, and Category 3 (open with no surface occupancy) on about 9,440 acres. About 21,120 acres would remain closed to oil and gas leasing.
- The present domestic livestock grazing use would continue as authorized in the MFP (1,496 Animal Unit Months [AUMs]). Use and maintenance of the Muddy Creek Trail would continue without concern for

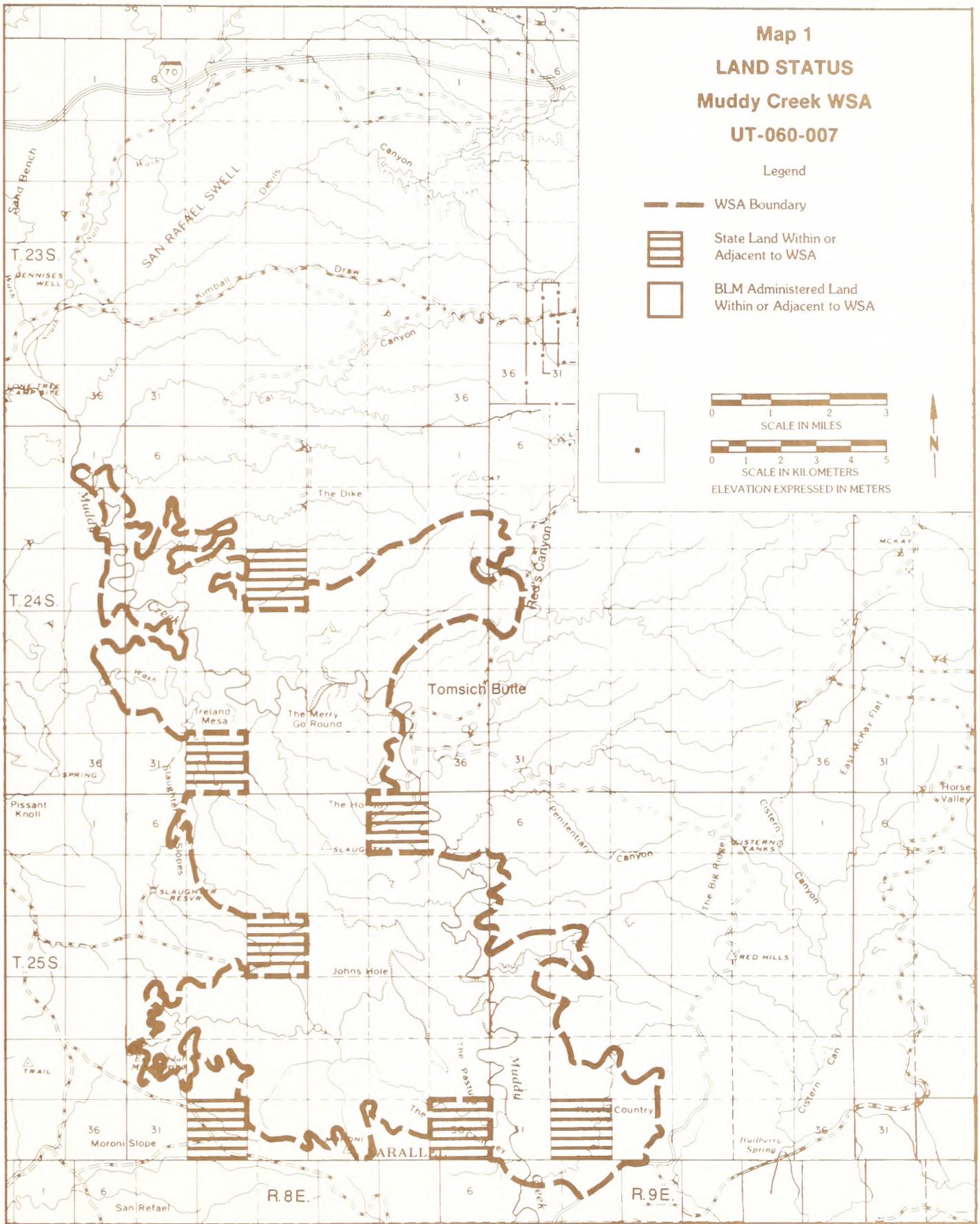
wilderness values. New rangeland developments could be implemented without wilderness considerations although none are planned.

- Developments for wildlife, water resources, etc. would be allowed without concern for wilderness values if in conformance with the applicable land use plan. None are currently planned.
- The entire WSA acreage, including 7 miles of vehicular ways, would continue to be closed to off-road vehicle (ORV) use. New access roads could be allowed.
- The entire 31,400-acre area would continue to be closed to commercial woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II (31,400 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

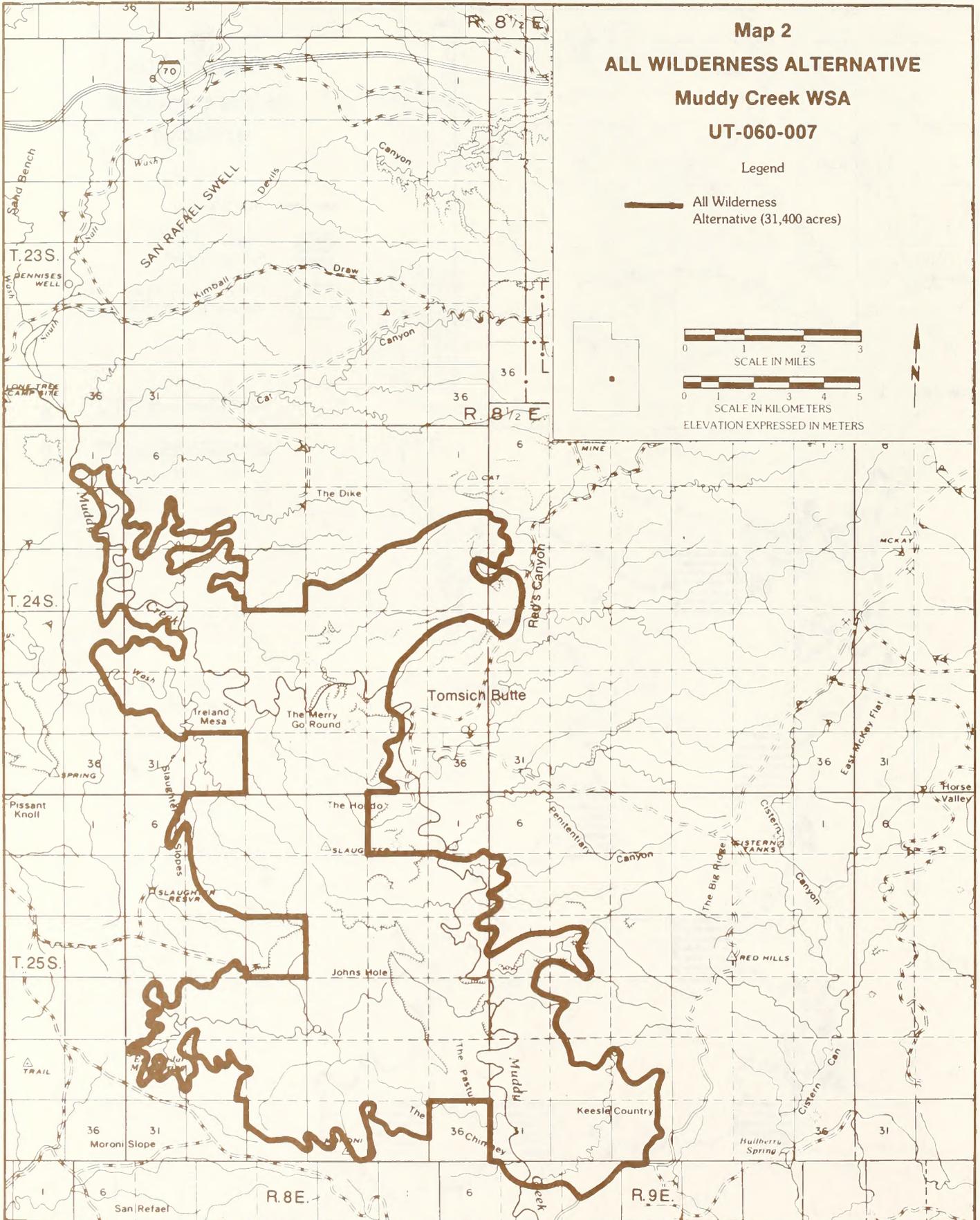
ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 31,400 acres of the Muddy Creek WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. On designation, acquisition of one section of State land (640 acres) within the WSA (refer to Map 1) is likely, and would be authorized by purchase or exchange. Three of the six State sections outside of but adjacent to the WSA would likely be

MUDDY CREEK WSA



MUDDY CREEK WSA



MUDDY CREEK WSA

acquired. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. (Refer to Volume I for further information on State in-holdings.) The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 31,400 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 6,000 acres of 303 existing mining claims that may be determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with wilderness as a consideration. Existing oil and gas leases involving about 1,600 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The 1,496 AUMs on six allotments in the WSA would remain available to livestock as presently allotted. Use and maintenance of rangeland developments existing at the time of designation (the Muddy Creek Trail is the only existing development) could continue in the same manner as in the past, based on practical necessity and reasonableness. After designation, new developments (none are planned) would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management, if consistent with wilderness protection standards (refer to Appendix 1). Two wild horse herds numbering from 7 to 15 animals would continue to be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). No water resource facilities or treatments are located in the Muddy Creek WSA, and none are currently planned.
- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 31,400-acre area would be closed to vehicle use (it is now closed to ORVs) except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Approximately 7 miles of existing vehicular way in the Chimney Canyon drainage area would not be available for vehicular use except as indicated above. This way is passable only by foot or horseback at present. About 2.5 miles of the WSA boundary (in two locations) follow existing gravel and dirt roads that would remain open to vehicular travel. Two roads dead end on State lands (Township 25 South, Range 8 East, Sections 2 and 16) adjacent to the WSA boundary, and these roads would remain open to vehicular access.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 31,400-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to the wilderness area or dead end at the wilderness boundary for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned. Commercial harvest of pinyon-juniper for firewood, fenceposts, or Christmas trees in the WSA is not allowed.
- Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unaccept-

able change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.

- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations, but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison.

AFFECTED ENVIRONMENT

Air Quality

The WSA is a Prevention of Significant Deterioration (PSD) Class II attainment area and currently

meets Class II standards of air quality classification (1977 Clean Air Act amendments). The nearest Class I area is Capitol Reef National Park, located approximately 12 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from Castle Valley and the Green River-Moab area. A large point source includes powerplants in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles.

Geology

The Muddy Creek WSA is within the Colorado Plateau Physiographic Province and lies along the southwestern flank of the San Rafael Swell. During the Eocene Age, the area began to be uplifted, creating an upwarp in the existing sedimentary sections. A period of nondeposition and erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent north-trending uplift on the Colorado Plateau. Elevations range from 5,000 to 7,000 feet. Geologic formations outcropping in the WSA range from Permian Coconino Sandstone on the east to the Jurassic Carmel Formation on the west. The formations dip to the west at an angle of less than 10 degrees.

The Coconino Sandstone can be found mainly along the lower portion of the Muddy Creek drainage and its tributaries. The Chute is one of the major canyons carved into this sandstone. It is white to buff, fine-grained, cross-bedded, massive, eolian sandstone with limestone occurring at the base.

The Kaibab Limestone is another formation found above the Coconino and along the Muddy Creek and its associated tributaries. It is a light gray to brown, sandy, cherty limestone. The formation contains many chert geodes with quartz and calcite crystals.

The Moenkopi, found in the surrounding area of The Chute, consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-gray and red shale, and conglomerate. The Moenkopi is known as an oil and gas producer in the Grassy Trail Field to the northeast. Towards the base of the formation is the Sinbad Limestone Member.

MUDDY CREEK WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MUDDY CREEK WSA**

Resource	Alternatives	
	No Action	All Wilderness (31,400 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 3 million barrels of oil from tar sand, 750,000 tons of potash, 100,000 tons of manganese, and 50,000 tons of copper. Long-term potential for recovery of 1,000 tons of uranium oxide is high.	Oil, gas, and potash likely would not be recovered. Assuming a worst-case analysis, the recovery of locatable minerals would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant, with the possible exception of loss of recoverable uranium.
Wildlife	About 0.8 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 1,496 AUMs would continue. There are no existing developments. New developments could be constructed; however, none are now planned.	Grazing of 1,496 AUMs could continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 253 acres.	Visual quality could be impaired on up to 53 acres.
Recreation	ORV use in the WSA could continue, including use of 7 miles of way which is currently not used. Overall recreational use could increase from the present 150 visitor days per year to 225 over the next 20 years. Up to 253 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 7 miles of way, would be closed to ORV use. Recreational use could increase to up to 1,570 visitor days over the next 20 years due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 253 acres (0.8 percent of the WSA).	Wilderness values would be protected, except on up to 53 acres (0.17 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , State of Utah plans and policies, and the current BLM San Rafael MFP.	This alternative would not be consistent with Emery County plans. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM San Rafael MFP.
Socio-economics	Annual local sales of less than \$42,435 and Federal revenues of up to \$6,894 would continue. An additional \$26,040 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$42,435 and Federal revenues of up to \$2,094 could continue, but Federal revenues of up to \$30,840 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, but increased recreational use over the next 20 years might result in local benefits of up to \$6,437 per year.

MUDDY CREEK WSA

Situated along the cut cliff of the Muddy Creek drainage is the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and inter-tonguing. The formation is a uranium producer and composed of four members: Temple Mountain, Monitor Butte, Moss Back, and Church Rock.

The Wingate Formation lines the cliff faces of the Muddy Creek Canyon drainages. It consists of buff, orange and brown, massive cross-bedded, medium-grained sandstone and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

The Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are several arches, caves, buttes, and knolls.

The Carmel Formation is found along the WSA's western and northwestern boundary. It consists of brown to gray, sandy limestone, red, thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

Soils

Soil types were placed into broad classes from photo interpretation of landscapes and knowledge of dominant soil types in similar locations. Soil characteristics are shown on Table 2.

Wind is an important erosive agent in the WSA; however, water actions move the most soil. Erosion potential is low. Because of the lack of vegetation ground cover, exposed bedrock, and patterns of brief, intense summer thunderstorms, locally severe erosion problems are present. This is especially true on steep slopes and exposed wash channels.

A summary of erosion estimates is shown in Table 3.

Vegetation

Existing vegetation types are listed in Table 4. The dominant type of vegetation in the WSA is a

combination of pinyon-juniper woodland and desert shrubs. The pinyon-juniper vegetation type is found on foothills and mesas. Stands in the WSA are sparse with desert shrub understory. Major species are pinyon pine and Utah juniper. Major desert shrubs are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock outcrop	35	10,990	0	0
Shallow loamy soils on sloping structural benches	40	12,560	1	5
Moderately deep to very deep stony soils on moderately steep to steep alluvial fans	25	7,850	1	10
Totals	100	31,400		

Source: Hansen, 1985.

Greasewood and grassland make up the remainder of the WSA. Greasewood is mainly found on valley floors, bottom lands, and floodplains of perennial and intermittent streams where salty water tables are available at least part of the year. Other salt-tolerant plants associated with this type are tamarisk, shadscale, alkali sacaton, and salt grass. Also found are cottonwood, rabbitbrush, big sagebrush, black sagebrush, and curly grass. Major grasses are blue grama, Indian ricegrass, and sand dropseed. Other grasses include western wheatgrass, Fendler threeawn, needle-and-thread, and squirreltail. Although Muddy Creek flows through the WSA, it is not considered a riparian area due to the lack of vegetation characteristics.

Five candidate species under review for threatened or endangered status by the U.S. Fish and Wildlife Service (FWS) (*Hymenoxys depressa*, *Pediocactus despanii*, *Sphaeralcea psoraloides*, *Schoenocrambe barnebyi*, *psorathamnus polyadenius* var. *jonesii*), one proposed Endangered (*Cycladenia humilis* var. *jonesii*), and two listed endangered plant species (*Erigeron maguirei* var. *maguirei* and *Sclerocactus wrightiae*) are found near or within the WSA).

MUDDY CREEK WSA

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/ acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	0
High	10.0	0	0	0	25	7,850	78,500
Medium	5.0	0	0	0	40	12,560	62,800
Low	1.0	65	20,410	20,410		0	0
Very Low	0.1	0	0	0		0	0
None	0.0	35	10,990	0	35	10,990	0
Totals		100	31,400	20,410 ¹	100	31,400	141,300 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.51 under present conditions; 4.5 if disturbed.

The Muddy Creek WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types in the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper/desert shrub	14,896	47
Desert shrub	8,160	27
Pinyon-juniper	6,953	22
Greasewood	692	2
Grassland/desert shrub	699	2
Total	31,400	100

Source: USDI, BLM, 1979a.

Water Resources

Muddy Creek bisects the WSA from northwest to southeast for about 20 miles and is the major perennial water source. A spring in the southwestern portion of the WSA is the only other

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Saltbush-greasewood	21,952	70
Galletta-threawn shrub	9,448	30
Total	31,400	100

Source: USDI, Geological Survey, 1978.

known water in the WSA. It is also considered perennial. There may be some small ephemeral or intermittent seeps and/or waterholes that have not been recorded. There are no developed waters in the WSA.

Water quality in Muddy Creek is generally poor, but adequate for wildlife and livestock needs. Upstream agricultural practices may present some problems for human use of water in terms of taste, solids, salinity, nutrients, and coliform bacteria. Quality of the water from the spring is better than that of the creek. No specific data on water quality are available.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

The potential for mineral resources is relatively high. An overall importance rating (OIR) of 3+ was assigned to the Muddy Creek WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR applies to 75 to 100 percent of the tract evaluated by SAI. The rationale stems from the numerous uranium mines and occurrences reported along the eastern side of the WSA, and most authors' opinion is that the southern part of the Swell is favorable for large ore bodies. It should be recognized that all of the mines and associated activities mentioned in the SAI evaluation are outside of the border of the WSA. The energy and mineral ratings are given in Table 6.

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c3	Less than 10 million barrels of oil in-place
Uranium/ Vanadium	f4	c4	Greater than 1,000 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c1	Low temperature
Hydropower	f1	c4	None
Copper	f2	c2	Less than 50,000 tons
Manganese	f2	c1	100,000 tons of 40-percent manganese
Potash	f2	c2	Less than 1 million tons

Source: SAI, 1982³.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³SAI did not rate gypsum; however, BLM has added text information.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of

Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA contains deposits of vanadium and could contain copper and manganese that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983).

Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

LEASABLE MINERALS

There are no existing mineral leases in the WSA other than oil and gas. Other leasable minerals produced regionally include potash and coal. Tar sand has also become a recent production interest and could be leased in a combined hydrocarbon lease that would also include oil and gas.

Oil and Gas

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore

MUDDY CREEK WSA

and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

There are currently five pre-FLPMA oil and gas leases that cover approximately 3 percent of the WSA (1,600 acres). The WSA was included in the "BLM Price District Oil and Gas Categories Environmental Analysis Report" (USDI, BLM, 1975). The results established oil and gas categories as shown in Table 7. There are no known deposits of leasable minerals being actively explored or extracted in the WSA.

TABLE 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	640	2
2. Open with special stipulations ¹	200	1
3. Open with no surface occupancy	9,440	30
4. No leasing	21,120	67
Total	31,400	100

Source: USDI, BLM, 1975.

¹Special stipulations have been developed to protect the Muddy Creek drainage.

The SAI favorability rating indicates that a low potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. Less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas are estimated to be recoverable. Positive evidence of resource occurrence is some distance away or in a situation that may be considered unrelated to the geology of the WSA.

To have an oil and gas field, certain conditions must be met. These conditions include a source for petroleum, porous and permeable rock (reservoir rock), and traps. Traps can be either stratigraphic, structural, or a combination of both. Structural traps are caused by folding, faulting, fracturing, and intrusions of salt plugs.

The San Rafael Swell is a structural trap. The interior of the Swell has been eroded away, probably allowing any petroleum contained in the structure to escape. The Swell could only serve as a trap for formations below the Hermosa, the

lowest formation stratigraphically exposed in the Swell. The Ferron Gas Field, 24 miles north of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance Gas Field, 8 miles to the southwest, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail Field, 54 miles to the northeast, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 1 mile east of the WSA's southeastern boundary. The well was plugged and abandoned on February 1, 1959. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Muddy Creek WSA would probably be as small pools and/or fields.

Tar Sand

Minor tar sand occurrences can be found along the eastern and northeastern boundaries of the WSA. These deposits may extend into the WSA and would be found within the Kaibab Limestone.

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving behind the heavy fraction, or tar substance. The San Rafael Swell is estimated to contain 445 to 545 million barrels of oil in-place, with most of it in the Moenkopi Formation. The nearest deposit of Moenkopi to the WSA is in the Family Butte deposit located 2 miles northeast and is a part of the San Rafael Swell Special Tar Sand Area (STSA). The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of asphaltic material (tar sand). The Muddy Creek WSA is not within the San Rafael Swell STSA.

The SAI favorability rating for tar sand indicates a moderate potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. It is unlikely the tar sand within the WSA will be developed due to small-sized deposits, and economic factors.

MUDDY CREEK WSA

Coal

The WSA is considered geologically unfavorable for coal. Cretaceous coal-bearing strata either never were deposited or have been eroded away. The SAI favorability rating for coal indicates there is no deposit.

Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousand feet thick in the area of Moab where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating indicates that, if deposits occur in the Muddy Creek WSA, they would generally contain less than 1,000,000 tons of potash. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it likely that the potash resource in the WSA would not be developed.

Hydropower

A survey of potential hydropower sites in Utah indicated that no potential sites have been identified in or near the WSA. On the basis of that information SAI rated the hydropower potential as low.

Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal water (between 20 degrees Centigrade [C] and 90 degrees C). Water extracted at these temperatures can be used for direct heating purposes. It seems very unlikely that this resource, assuming it exists, would ever become economical to use considering the probable great depth of the resource, the associated high drilling costs, and the lack of nearby potential users. SAI rated the potential as low.

LOCATABLE MINERALS

There are 303 mining claims located within the Muddy Creek WSA. They cover approximately 6,000 acres totaling about 19 percent of the WSA. None of these claims have been patented. Of the 303 claims, only 119 appear to have current assessment.

Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These deposits are scat-

tered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock Members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member. Two mines are adjacent to the northeastern boundary of the WSA. Together the mines produced a little over 2,911 pounds of uranium oxide during the 1950s to 1970s. Several other mines located near these two and outside the southern boundary of the WSA have produced up to 51,528 pounds of uranium oxide.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these other minerals occurs in sufficient grades or quantities within the WSA to be minable. These metals indicate a hypothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The southern uranium belt, which extends through the eastern part of the WSA, is most favorable for the occurrence of ore deposits. Moderate and large-size ore bodies are found in the southern belt (Hawley et al., 1968). The large ore body of the Delta Mine, located in the southern belt and 1 mile south of the WSA, occurs in a sandstone lens of the Monitor Butte Member. The ore body is enclosed in red, purple, and pale-green mudstone and attains a maximum thickness of 20 feet. The main ore minerals are uranite and carnotite and are believed to be deposited by solutions that traveled laterally along bedding plane fractures until the sandstone lens was reached. The ore grade is relatively rich (greater than 1 percent uranium oxide).

The ore-bearing solutions responsible for the deposition of the Delta ore body could have deposited similar ore bodies in the immediate vicinity. SAI gave a high rating to the WSA indicating a high potential for a large, overall tonnage of ore (greater than 1,000 tons of uranium oxide), although it is believed that individual ore bodies within the WSA, if present, would probably be scattered and small to moderate in size. The Chinle Formation outcrops on the eastern side of the WSA and the thickness of the overburden increases to the west. Most surface deposits in the

MUDDY CREEK WSA

area have been discovered and subsurface deposits would require drilling for exploration and development. The western and mid-portions of the WSA are also very remote and composed of rough terrain. Cost for drilling would increase due to these combined factors, whereas the economic potential is greater on and near the outcrop.

Manganese

Manganese deposits in the area are estimated to be chiefly small and low grade, occurring in the Morrison and Summerville Formations. The nearest known deposits are 38 miles northeast of the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the SAI low favorability rating indicates a deposit size of up to 100,000 tons of 40-percent manganese. However, SAI also indicated that, in fact, the WSA is favorable for only very small accumulations, several tons at the most. The low certainty rating was assigned due to inconsistency in data.

Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is the Copper Globe Mine located about 7 miles north of the Muddy Creek WSA. The mine produced 2 or 3 tons of ore copper between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The SAI favorability rating indicates a low potential for copper deposits in the WSA, which, if found, would be small in tonnage (less than 50,000 tons of contained copper).

Gypsum

The Carmel Formation is reported to contain a bed of industrial grade gypsum in the far north-western portion of the WSA. The BLM has given gypsum a favorability rating indicating a low potential for occurrence. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million tons). It is unlikely that any gypsum would be developed due to distance of mines to market and related transportation concerns.

Salable Minerals

Although the potential exists for use of rock materials from the WSA, it is considered to be very low due to limited demand and high availability of these materials elsewhere in more accessible locations.

Wildlife

The Muddy Creek WSA provides habitat for a limited variety of wildlife species. Muddy Creek is

a perennial water source; however, use is limited due to difficult access. A few rock water holes occur in the WSA and are evident especially after rain. These cannot be relied upon by wildlife as a permanent water source, as they evaporate during extended dry periods. During winter months snow (when available) provides a water source. Vegetation is also a limiting factor due to low density, limited species composition, and bare rock surfaces.

The WSA provides habitat for low density populations of mule deer. Twelve desert bighorn sheep were sighted along the San Rafael Reef (approximately 2 miles to the southeast of the WSA) in 1983. None of the WSA has been identified as crucial habitat for this species.

The WSA provides habitat for coyote, bobcat, cottontail rabbit, blacktail jackrabbit, woodrat, ringtail, badger, Ord Kangaroo rat, gray fox, kit fox, whitetail antelope squirrel, chipmunk, rock squirrel, bat, mice, and vole.

Habitat for various small bird species is found within the WSA. The species diversity and population sizes are small due to the lack of a diverse habitat. Where most of the WSA's vegetation exists along Muddy Creek, the highest density of avian fauna occur. Few individual raptors are found in the WSA. Of those present, golden eagle (BLM sensitive species), prairie falcon, American kestrel, red-tailed hawk, ferruginous hawk (candidate species under status review by FWS), and rough-legged hawk (winter resident) are the most common. Waterfowl and shore birds generally do not exist in the WSA. Chukars in the WSA are usually found within 1 mile of Muddy Creek. Mourning dove nest within the WSA.

Several species of snakes and lizards can be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, and common tree lizard are the most common. Great Basin gopher snake, striped whipsnake, western rattlesnake, and western terrestrial gartersnake account for the majority of snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

Mountain lion may occasionally visit the area but, with low deer numbers, are a rare occurrence. No documented sightings are recorded.

The portion of Muddy Creek flowing through the WSA has been classified by the Utah Division of Wildlife Resources (UDWR) as a limited value, nongame fishery, Class V stream. Speckled dace, flannel mouth sucker, bluehead or green sucker, and roundtail chub are species found in this

MUDDY CREEK WSA

portion of the Muddy Creek. Tadpole shrimp (crustaceans) may be present in the various water holes.

The peregrine falcon (an endangered species) is thought to be a possible visitor to the WSA. No known sightings or identified critical habitat exist, but the potential habitat (12,266 acres) is there. Bald eagle may be found along the Muddy Creek searching for food in the winter. No known sightings have occurred in the WSA.

There are no potential or existing wildlife management facilities within the WSA, and no projects for vegetation treatment have been identified.

Forest Resources

The dominant forest type is juniper-pinyon woodland, found in sparse quantity on 14,896 acres within the WSA. This community is used commercially throughout the Southwest for firewood, fenceposts, and Christmas trees. Because of the remoteness from populated areas and availability of the products closer to population centers, the BLM does not allow any of these uses in the WSA.

The area could yield approximately 29,792 cords of pinyon-juniper woodland products if favorable variables (i.e., slope, access, etc.) were present.

Livestock and Wild Horses/Burros

The Muddy Creek WSA contains portions of six livestock grazing allotments as listed in Table 9.

There is only one range improvement project in the WSA, the Muddy Creek Trail, located in the

upper northwestern corner of the WSA. The trail is used by livestock and wild horses as access to the Muddy Creek drainage. There are no potential grazing improvements identified in the WSA.

Two separate herds of wild horses frequent the western and northern parts of the WSA. Herd numbers range from 7 to 15. One other herd has been seen adjacent to the WSA's eastern boundary, near Penitentiary Canyon.

Visual Resources

The Muddy Creek WSA consists of several incised drainages and major canyons, volcanic and colorful rolling terrain, large rounded knobs of arch-forming sandstone, alcoves and caves, and red stair-stepped mesas.

One major canyon drainage, Muddy Creek, cuts through the length of the WSA. Many other tributaries carve their way to the Muddy Creek Canyon. These canyons cut through and expose successively the dark red Carmel Mudstone, pink and tan rounded Navajo Sandstone, ledgy grayish Kayenta Sandstone, red and gold sheer cliffs of Wingate Sandstone, and the buff, brown-dripped Coconino Sandstone. Major tributary canyons of the WSA are Willow Springs Wash, Hebes Canyon, The Chimney, and The Chute.

Near the northwestern boundary of the WSA is colorful pink, purple, and grayish rolling terrain. Atop the canyons are large rounded knobs of arch-forming sandstone. The Hondo Arch is a dominant visual feature in the WSA's eastern part.

From most viewpoints in the upper levels of the WSA's canyon system, the landscape would be

TABLE 9
Livestock Grazing Use Data

Allotment	Class of Livestock	Number of Operators	Season of Use	Total AUMs on Federal Land	Total Acres on Federal Land	Percent of Allotment in WSA	AUMs in WSA	Percent of AUMs in WSA
Lone Tree	Cattle	9	12/16 to 05/31	5,271	104,523	15	791	15
Red Canyon	Cattle Horses	5	11/01 to 03/15 11/16 to 02/28	2,243 7	42,197	1	0	0
McKay Flat	Cattle	1	11/01 to 04/15	2,228	50,352	14	312	14
Mussentuchit	Cattle	2	10/26 to 06/10	1,997	55,698	9	180	9
Hondo	Cattle	1	11/01 to 05/31	336	11,798	16	36	11
Rock Springs	Cattle	1	11/01 to 05/31	4,414	89,767	4	177	4
Total		19					1,496	

Source: USDI, BLM, 1979a.

MUDDY CREEK WSA

classified panoramic in that there is little impression of visual boundaries and distant views are seldom blocked by landforms in the foreground. From within the canyons the landscape would be classified enclosed. Views within the canyons are dominated by vertical red and gold sandstone walls.

The southeastern portion of the WSA is referred to as Keesle Country. The terrain is deep red in color, formed by mesas situated in a stair-stepped fashion as the country dips gently to The Chute. Here the Coconino Sandstone is exposed by a dramatic cut of Muddy Creek. Buff, tan, and rust color rocks are rounded, cracked, and carved into a deep, narrow passage. The walls are dripped with a dark brown-black color and the landscape is one of outstanding and interesting visual quality.

The WSA (31,400 acres) is classified as having Class A scenery that contains the most outstanding characteristics of the physiographic region. The sensitivity level of this area has been rated high due to the outstanding visual quality experienced by the viewer from the most accessible areas. Based on these factors the entire WSA falls within the VRM Class II management area.

Cultural Resources

Only 160 acres of this area have been inventoried. No sites have been formally recorded in the WSA but several have been located by recreationists and ranchers along the Muddy Creek. No known National Register sites, existing or proposed, are in the WSA.

Recreation

Because of the remoteness and rough terrain of the WSA, recreation use is sparse and concentrated near available access points. Two roads lead to the eastern and southeastern boundaries. At these points the WSA can be entered by way of the Muddy Creek drainage and its tributaries. Recreational use of these areas include hiking, backpacking, sightseeing, floating down the creek, horseback riding, and motorcycling.

The upper stretch of the Muddy Creek is wide and labyrinthian in character. During the early spring months when runoff is high, this portion of the stream is floated by recreationists in inner tubes, kayaks, and small inflatable craft. The high water period usually is very short (1 week) and during some seasons the river is not floatable. This stretch, however, is used year-round for hiking and horseback riding.

The lower stretch of the Muddy Creek, known as The Chute, has been floated by only a few groups. The canyon is narrow and twisting, made up of a series of rapids and relatively swift current. Small inflatable craft, inner tubes, and kayaks have also been used in this portion of the river. Technical maneuvering is required by the floater. High water levels are necessary for floating; however, flood stages are dangerous due to the confined character of the drainage. Muddy Creek previously was listed as a National Rivers Inventory segment for study as a potential addition to the National Wild and Scenic Rivers System; however, it is no longer listed (USDI, National Park Service, 1982).

An old mining trail exists in the area of The Pasture and The Chimney. The trail is badly eroded in places and can only support travel by foot or horseback. Some recreationists have taken advantage of this trail to gain access into the remote canyons of The Chimney.

Motorcycle riding is occasionally concentrated around the two main access roads (Red Canyon and Hidden Splendor) to the WSA. During the low water months, recreationists travel along the river drainage and explore some of the old uranium mines located adjacent to the WSA's eastern boundary. Exact user numbers are unknown; however, periodic field observations indicate a low interest in the area and probably no more than 50 visitor days per year. These access roads are also used by sightseers, drawn to the area to view Hondo Arch and explore some of the old mine and cowboy camps that spot the area.

Under the San Rafael MFP (USDI, BLM 1979a), ORV designation for the WSA would be closed in accordance with 43 CFR 8340. This would include 31,400 acres and 7 miles of vehicular way. ORV designations have not yet been implemented. Similar areas found in other parts of the resource area are not proposed to be designated closed to ORV use.

There are no recreational facilities within the unit. Several primitive camping spots exist along the Muddy Creek drainage, but use of these is very sporadic. Several wild game trails and an old mining exploration trail have been used by recreationists.

Recreation use in the WSA is estimated to be up to 50 visitor days per year for hiking and backpacking, with river floating averaging up to about 40 visitor days per year. Total annual recreation use for all activities in the WSA is estimated at about 150 visitor days per year.

Wilderness Values

SIZE

The WSA (31,400 acres) is of sufficient size to enhance the wilderness values present.

NATURALNESS

The major imprints surrounding the Muddy Creek WSA have been excluded during the boundary determination process. What remains of note are two ways, the Muddy Creek range trail, an airstrip, two cabin structures, an old vehicle, and two mine shafts. These imprints occurred before 1976 (unless otherwise noted).

A way, approximately 7 miles long, follows the cliff contours through The Pasture and into the canyon drainage of The Chimney. Positioned in the red mudstone of the Carmel Formation, the old road cut has eroded severely, making passage possible only by foot or horseback. The way is more visible in some parts than in others. In general, it has become a useful passage route that blends well with its surroundings. Another way, extending approximately 0.25 mile into the north-eastern boundary, was developed without authorization in 1983. The route has been reclaimed and is now unnoticeable.

The Muddy Creek range trail is located in the upper northwestern corner of the WSA. The trail is used by livestock and wild horses to access the Muddy Creek drainage.

Associated with the way leading into the canyon of The Chimney is an abandoned airstrip, two cabin structures near a spring, and an old station wagon buried in the wash. The airstrip is located near the wash bottom on level and wide-open terrain. Over the years, erosional patterns have begun to cut across the strip, and sparse vegetation is returning. One old cabin and a chicken coop are located near a spring about 1 mile west of the airstrip. Halfway between the strip and cabins is the old station wagon buried to the roof in the wash.

Two mine shafts are located adjacent to the WSA's northeastern boundary. Several other mining shafts are located in the surrounding area.

These imprints combined cover approximately 2 percent (628 acres) of the WSA. The remaining acreage (30,772 acres) could be considered unspoiled in character. All 31,400 acres meet the naturalness criterion for areas under wilderness review.

SOLITUDE

The WSA offers outstanding opportunities for

solitude. The major canyons and rugged remote terrain offer miles of opportunities for users to experience seclusion and isolation. Steep cliffs, narrow passages, and broken terrain effectively shroud lines of sight and suppress sounds for any substantial distance within these canyons. Offsite intrusions and influences are essentially non-existent within the canyons.

The higher reaches of the WSA, above the canyon drainages, are rough and broken in character. From above, great vantage points are afforded for views of the volcanic intrusions to the west and south. To the north and east the erosional patterns of the San Rafael Swell can be viewed. Offsite intrusions are essentially nonexistent from above. Vegetation cover is limited and does not effectively screen visitors; however, the broken and rough terrain does allow for separation and the feeling of seclusion. Expansive views of the natural surroundings give the feeling of remoteness.

In summary, the Muddy Creek WSA (31,400 acres), a roadless area roughly 10 miles long and 3 to 6 miles wide, contains the opportunities for solitude that meet the outstanding criterion for areas under wilderness review.

PRIMITIVE AND UNCONFINED RECREATION

Tubing and kayaking of wild, small, desert rivers is becoming a popular recreation activity. The Muddy Creek drainage has been explored by a small number of floaters, and inquiries on the area have increased over the past 2 years.

The river offers two different adventures during a short floating season. One will take the floater down an open, twisting canyon segment. The second involves some technical maneuvering through a deep narrow passage stream with rapids and relatively swift current. Add an element of risk to the trip and the floater finds the Muddy Creek an outstanding primitive adventure.

Hiking, backpacking, and horseback riding are some of the main recreational opportunities available in the WSA. The rugged and remote character of the area, red-walled cliffs, pinnacles, knobs, isolated tracts of land, arches, and archaeological remnants all contribute to a high-quality recreational experience. In addition to the outstanding activities already mentioned, the striking scenery makes sightseeing, photography, and artistic endeavors of high quality.

All 31,400 acres of the WSA meet the outstanding recreation criterion set for areas under wilderness review.

SPECIAL FEATURES

The Muddy Creek WSA offers four supplemental features of geologic, scenic, archaeological, and ecologic values. These features enhance the other opportunities available within the unit.

The canyons of the WSA offer many exposed geologic strata and formations, including cliffs, knolls, alcoves, caves, and arches. The upper reaches provide dramatic views of the twisted and carved character of the area surrounded by the volcanic and swelling action of the land. The Chute is a good example of the unusual erosional pattern of a drainage through some of the oldest formations exposed in the San Rafael Swell.

The archaeological values of the WSA are unknown; however, scattered evidence has been found by recreationists and ranchers along the Muddy Creek drainage. Remnants of cowboy camps and mining activities of the 1940s are also present in several places of the WSA and might be historic in value. These qualities have not been evaluated or recorded.

Two herds of wild horses frequent the WSA in the west, north, and east portions. Numbers in the herds range from 7 to 15 horses.

Land Use Plans and Controls

There is one State of Utah owned section of land within the WSA (640 acres). All other lands within the WSA are public lands with both surface and mineral estates managed by the BLM. There are six sections of State-owned land adjacent to the WSA.

There are no recreational or other withdrawals within the WSA nor are there valid rights-of-way within or adjacent to the WSA.

Physical and legal access to the WSA is provided by a road through Reds Canyon and another through Hondo country to Tomsich Butte on the eastern portion of the WSA. The Hidden Splendor road gives access to the southern portion of the WSA and one other road lends access to the western boundary of the WSA near Cedar Mountain.

No other lands contiguous to the WSA are being considered by other agencies for wilderness.

The area is identified in the San Rafael MFP (USDI, BLM, 1979a) for multiple-use management, subject to specific development restrictions (such as leasing Categories 3 and 4 and VRM Class II). The WSA has also been identified in the BLM plan for its special values to be consid-

ered further as an Outstanding Natural Area (ONA) or an Area of Critical Environmental Concern (ACEC).

In the *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing).

Socioeconomics

DEMOGRAPHICS

The WSA is located in the south-central portion of Emery County. Activities in this part of the San Rafael Swell are significant primarily to Emery County, with some minor concern to Carbon County. Emery County had a population of 12,900 in 1982, not quite 1 percent of the State population (University of Utah, Bureau of Economic and Business Research, 1982). Most of the population occurs in Castle Valley, the northwestern part of the county. There are two service centers in northwestern Emery County: Castle Dale, the county seat (1980 population of 1,910) and Huntington (1980 population of 2,316). Other towns in Castle Valley are Elmo (1980 population of 300), Cleveland (1980 population of 522), Orangeville (1980 population of 1,309), Ferron (1980 population of 1,718), and Emery (1980 population of 372) (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The Town of Green River is located in the southeastern part of the county and has a population of 1,282.

Emery County contains 4,449 square miles of land. About 82 percent of the county is owned by the Federal Government, 11 percent by the State, and 7 percent by private residents.

EMPLOYMENT

Statistics (refer to Table 9) indicate that almost half of the county income and about 40 percent of the employment is from mining, mostly coal. Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important sources of employment and income. Agriculture accounts for 0.60 percent of the county income, and less than 1 percent of the total employment.

During 1970-1980, Emery County experienced the largest percentage change in population, increasing by 109.7 percent (5,137 to 11,451). This increase was brought about by construction of the powerplants mentioned before and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at

various times during the county's history.

Since 1982 the local industry has been in a slump. Despite a 17-percent decrease in employment between 1981 and 1983, it remains the largest employer in the area (Utah Department of Employment Security, 1981 and 1983).

TABLE 9
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate Services	1	1
Other	2	6
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

INCOME AND REVENUES

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and dispersed recreation.

Table 10 summarizes local sales and Federal revenues related to the Muddy Creek WSA. Production from mines and prospects within and adjacent to the WSA has brought some income and temporary employment to residents of the area (approximately 30 work years). The WSA has

about 119 mining claims that are current in assessment work. Regulations require a \$100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

TABLE 10
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$4,800
Mining Claim Assessment	\$11,900	None
Livestock Grazing	\$29,920	\$2,094
Recreational Use	Less than \$615	None
Total	Less than \$42,435	Up to \$6,894

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Nineteen livestock operators have grazing use in the WSA. Based on the consumption of 1,496 AUMs of forage by cattle, it is estimated that the WSA accounts for \$29,920 of livestock sales, including \$7,480 of ranchers' returns to labor and investment.

Recreation use in the WSA is low and related expenditures are locally insignificant. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Muddy Creek WSA is estimated as about 150 visitor days per year resulting in total estimated expenditures of \$615 annually. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Emery County.

The WSA generates Federal revenues from two sources: grazing and mineral leasing. Within the WSA about 1,600 acres are currently leased for oil and gas. At \$3 per acre, this generates about \$4,800 annually. Half of this, or about \$2,400, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based upon 1,496 AUMs of forage consumed by livestock in the WSA and a grazing fee of \$1.40, the WSA annually accounts for \$2,094 of Federal revenue grazing fees. One half of this is allocated back to the local BLM district for range development projects.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. Even though the area would be open to resource use and development without controls for wilderness protection, it is likely that little overall development of mineral resources would take place

within the WSA in the foreseeable future. This would be due to the extremely rough and rocky terrain, development restrictions as per the San Rafael MFP (USDI, BLM, 1979a), and economic factors. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium, 40 acres; potash, 40 acres; and manganese, 13 acres. Together these would total a maximum of 253 acres of disturbance. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.)

AIR QUALITY

The WSA would continue to be managed as a PSD Class II area. Disturbance of 253 acres would result in minor increases in fugitive dust emissions.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with locatable minerals (i.e., uranium, manganese, etc.), oil and gas, and potash exploration and development activities would probably not exceed 253 acres. Since the activities likely would be dispersed, they would not significantly affect geology.

SOILS

It is estimated that up to 253 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about 0.65 cubic yard/year. The rate would increase to 4.5 cubic yards/year in disturbed areas. On the 253 acres, annual soil loss would increase from 164 cubic yards/year to 1,139 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 975 cubic yards (5 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 253 acres disturbed would not significantly impact the sparse vegetation of the Muddy Creek WSA.

Eight candidate, proposed endangered, or endangered plants occur in or near the WSA. There would be 253 acres of surface disturbance associated with mineral and energy exploration and development. A site-specific clearance would be conducted prior to any authorized surface-disturbing activity and avoidance of these plant

MUDDY CREEK WSA

species would be required. If these species could be affected, the BLM would consult with the FWS as required by BLM policy (refer to Appendix 4). The BLM would request a biological opinion when appropriate as required by the Endangered Species Act. Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of the plant populations would be preserved under the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Surface disturbance from mineral and energy exploration and development could impact 253 acres under this alternative, with a soil loss increase of up to 975 cubic yards/year. This could have an unquantified impact, increasing turbidity in Muddy Creek, primarily during high run-off periods.

No water developments or improvements have been identified for the WSA, and water resource development opportunities would continue to be minimal.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same (640 acres in Category 1; 200 acres in Category 2; 9,440 acres in Category 3; and 21,120 acres in Category 4) to protect the outstanding visual qualities of the area and the Muddy Creek drainage. The wilderness stipulations on 1,600 acres of existing post-FLPMA leases would be removed, and there would be an additional 8,680 acres available for lease (Categories 2 and 3).

The WSA is considered low in potential for oil and gas occurrences with less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas considered recoverable. These oil and gas resources could be explored and developed without concern for wilderness restrictions. However, due to the anticipated small size of the deposits, rough terrain, and lease category limitations on the majority of the area, little or no development is expected under this alternative. Due to these limitations, an estimated two-thirds of the recoverable potential of oil and gas would be foregone, should these resources exist in the WSA.

Tar Sand

Only 640 acres could be leased in Category 1. It is likely that the tar sand resource in the Muddy

Creek WSA would be leased, due to the management restrictions specified in the land use plans and the low potential for deposits that would be of sufficient size and availability for economical recovery.

Potash

The entire WSA would be open to potash leasing. The likelihood of the area being explored or developed is low due to thicker, richer, and more shallow deposits elsewhere.

Geothermal

Due to low water temperatures and distance from potential users, no development of geothermal resources is anticipated; however, with this alternative leases could be issued without wilderness considerations.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location. The potential deposit of greater than 1,000 tons of uranium oxide, 100,000 tons of 40-percent manganese, and less than 50,000 tons of copper could be developed. The majority of the WSA is remote and rugged, causing access difficulties and expense. The favorable geologic formation for uranium outcrops along the eastern boundary has been explored within an extensive distance surrounding the WSA. It is believed that surface deposits have been explored and only subsurface deposits may be possible. The formation of these deposits becomes deeper to the west and less favorable. Due to the current market conditions, locatable minerals in the WSA are not expected to be mined within the near future; however, with this alternative they would be available for recovery without wilderness limitations should market conditions change.

WILDLIFE

Wildlife could be adversely affected by possible surface-disturbing activities. Up to 12,266 acres of potential peregrine falcon habitat exist in the WSA. Although the presence of this species and the bald eagle has not been confirmed, portions of the potential habitat in the WSA could be impacted and would be lost to future introductions of peregrine falcon and possibly to natural establishment of both species. If use of the area by the peregrine falcon or bald eagle is confirmed and disturbance is proposed that could affect the species, the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would initiate Section 7 consultation with the FWS as

MUDDY CREEK WSA

required by the Endangered Species Act and BLM policy. The BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these raptors, it can be reasonably concluded that the viability of populations of this endangered species would be preserved under the No Action Alternative.

The 253 acres of disturbance would have adverse impacts to wildlife, particularly if the limited watering places were affected. Since wildlife populations in the WSA are currently at rather low levels, disturbance would not affect large numbers of animals, but changes in vegetation, cover, and water could have an impact to the few individuals present. No wildlife management facilities or vegetation projects exist or are planned within the WSA; therefore, the low habitat potential likely would remain as at present.

FOREST RESOURCES

Since there is a limited source of trees, occasional firewood use by campers and hikers in the area, and surface-disturbing activities would be restricted, there would be no significant effect on forest resources. The entire 31,400-acre area would continue to be closed to commercial woodland product harvest.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP (USDI, BLM, 1979a). The 1,496 AUMs currently allocated within three allotments are used by the livestock of 19 livestock permittees. Since very little use of motorized vehicles is currently being made to manage livestock, little effect to the environment is expected. The use and maintenance of Muddy Creek Trail would continue without concern for wilderness values. New rangeland developments (none are planned) could be implemented without wilderness considerations.

The two small herds of wild horses (approximately 7 to 15 animals) would continue use of the WSA as at present.

VISUAL RESOURCES

No significant impacts to visual resources are expected under this alternative. Potential surface disturbance within the WSA would be approximately 253 acres. The VRM Class II management objectives and actions would minimize visual contrasts created by intrusions; however, in local areas, Class II objectives may not be met. Some short-term visual impacts would be expected, although not to the degree of significantly degrad-

ing the area. A worst-case situation would be a substantial adverse impact to visual resources if access roads to valid mining claims are necessary throughout the area. Disturbance from oil and gas activities would not affect visual resources on about two-thirds of the area due to leasing category restrictions.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 253 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Generally, there would be no impact to cultural resources, but inadvertent loss or damage could occur in the disturbed areas. There are no known potential or existing National Register sites within the WSA.

RECREATION

The entire 31,400 acres would remain open, until such time as a proposal for ORV closure is implemented in accordance with the San Rafael MFP. Occasional motorcycle use (50 visitor days/year) near the access roads may be restricted if ORV designation is carried through.

Primitive recreation values would remain essentially as now exists, except where those values may be foregone in those local areas where potential surface disturbance may occur on up to 253 acres.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent/year over the next 20 years. At this rate, overall recreational use is expected to increase from 150 current visitor days/year to 225 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 50 visitor days/year to about 75 visitor days/year over the next 20 years. Likewise, recreational activities utilizing vehicular access primarily floating on Muddy Creek would increase from about 50 visitor days/year to 75 visitor days. ORV play activity would increase from 50 visitor days/year to 75 visitor days/year.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing San Rafael MFP. Because of the remoteness and rugged character of the WSA, recreational use has been low. Some of the most isolated portions of the area would retain their primitive character even without wilderness designation. Further, the MFP establishes limitations relative to certain activities that would tend to limit impacts to scenic values and the Muddy Creek drainage.

Impacts from locatable mineral extraction on valid mining claims would have the greatest potential to affect wilderness values in the WSA as a whole. Oil and gas leasing activities would have less potential to create impacts due to Category 3 and 4 designations.

Projected mineral and energy exploration and development could disturb an estimated 253 acres. Within the expected disturbed acreage, the outstanding opportunities for solitude and primitive and unconfined recreation would be foregone. Primitive recreation opportunities include hiking, backpacking, horsepacking, and floating Muddy Creek during the spring run-off.

Supplemental values (scenic, archaeological, and ecological) may be lost due to expected surface disturbance.

LAND USE PLANS AND CONTROLS

The No Action Alternative would be consistent with the *Emery County Zoning Plan* that identifies the area as a potential mining and grazing zone. The existing San Rafael MFP does not address wilderness; therefore, this alternative would be consistent with the MFP. However, it is noted that many of the MFP management goals that would be achieved with the No Action Alternative are very similar to the protection that wilderness designation would provide. The No Action Alternative would also be consistent with the State of Utah's plans and policies. Plans of other agencies would not be affected.

SOCIOECONOMICS

Under this alternative, no changes are expected in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected. Domestic livestock grazing (1,496 AUMs) would continue as authorized in the San Rafael MFP. The \$4,800 per year in Federal oil and gas lease revenues generated within the WSA would continue and could be increased by as much as \$26,040 in the future.

The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, prospects are marginal and there is limited possibility that potential resources would be utilized. Overall, the local economic impact would be considered insignificant.

All Wilderness Alternative (31,400 Acres) (Proposed Action)

As cited in the Description of the Alternatives section, the major changes that could occur in the 31,400-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 7 miles of existing vehicular ways (presently not passable) in the WSA would be closed to vehicular use except for approvals by BLM as noted in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed, causing an estimated 53 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (53 vs. 253 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, and forest resources would be insignificant for the All Wilderness Alternative as described for the No Action Alternative.

SOILS

The soil resources could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Soil loss on disturbed areas would increase from 0.65 cubic yard/year to 4.5 cubic yards/year. On 53 acres, this would result in a total annual soil loss increase from 34 to 238 cubic yards. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 204 cubic yards (1 percent).

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 53 acres under this alternative. Most of this disturbance would be expected in small, scattered locations in the northern part of the WSA. Because of the small, scattered areas affected, there would be no significant change (about 1 percent) from the current erosion situation and water resources would not be significantly impacted. Opportunities for water resource project construction would be foregone; however, no such development is planned in the Muddy Creek WSA.

MINERAL AND ENERGY RESOURCES

New leases and claims could not be established on 10,280 acres (33 percent of the WSA) and 31,400 acres (100 percent of the WSA), respectively, that could be leased and claimed without designation. The nonimpairment requirements with wilderness could restrict potential production from post-FLPMA leases (5 percent of the WSA) and 119 existing claims (19 percent of the WSA). However, 67 percent of the WSA would be closed to leasing and production even without designation. For the most favorable minerals the WSA is rated as having a high potential for a large uranium deposit; moderate potential for a small oil-impregnated rock deposit; and a low potential for small copper and potash deposits. (Refer to the Mineral and Energy Resources section for further discussion on the WSA's mineral potential.)

Leasable Minerals

Oil and Gas

Designation of the WSA could have only a small impact on exploration for oil and gas. There are five oil and gas leases covering 5 percent of the WSA (1,600 acres). All five leases are post-FLPMA in date, and would be subject to wilderness stipulations; these likely would not be developed. The additional 8,680 acres available for leasing would not be leased. Undiscovered oil and gas resources could not be explored or produced; however, potential of the area is considered low. Currently there is no production of energy resources occurring in the WSA. The potential exists for less than 3 million barrels of oil and 18 billion cubic feet of natural gas estimated to be recoverable, and these could be foregone.

It is concluded that impacts to oil and gas resources would not be significant due to small size of potential deposits, low certainty that these exist, and the low likelihood of development even without wilderness designation (refer to the No Action Alternative).

Tar Sand

With this alternative the entire 31,400 acres would not be leased (only 640 acres could be leased and realistically developed with the No Action Alternative). The likelihood of the resource ever being developed is low due to small-sized potential deposits. The potential for the occurrence of tar sand within the WSA is moderate for small deposits, with an estimated potential of up to 3 million barrels recoverable that could be foregone. Since size and economic factors are expected to preclude development of tar sand with the No Action Alternative, wilderness designation would have no significant effect on the potential use of this resource.

Potash

The potash-bearing rocks in the WSA are projected to be low grade, thin, and discontinuous. It is assumed there are a total of up to 750,000 tons of recoverable potash that would be foregone. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere. Currently there are no leases in the WSA for potash. With wilderness designation, the WSA could not be leased; however, this would not be a significant impact due to the low likelihood of development.

Geothermal

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

Locatable Minerals

There are 303 mining claims covering 19 percent of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam and those not current in assessment or not showing a valid discovery would be declared null and void. No new claims could be located after designation. Only 119 of the 303 claims appear to be current in their assessment.

If minerals are located prior to wilderness designation, it is estimated that up to 53 acres could

MUDDY CREEK WSA

be disturbed due to exploration and development of the locatable mineral resources, primarily uranium. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case the potential for recovery of more than 1,000 tons of uranium, less than 50,000 tons of copper, and 100,000 tons of 40-percent manganese would be foregone. After that date, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981).

Because production of these minerals is not currently occurring and economic considerations are unfavorable, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Therefore, this alternative would probably not result in any significant short-term loss of recoverable uranium and associated mineral resources; however, in the long term, such loss of uranium could be important.

WILDLIFE

Wildlife would benefit from prevention of an estimated 200 acres of surface-disturbing activities. Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife populations. Potential bald eagle and peregrine falcon habitat (12,226 acres) would be protected from potential surface-disturbing activities, allowing for future transplants or natural establishment. Mining claim development projected for 53 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA.

LIVESTOCK AND WILD HORSES

Present domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 1,496 AUMs currently allocated in the WSA would remain available for livestock forage. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing management is expected.

The existing rangeland project (the Muddy Creek Trail) would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources, if wilderness

protection criteria are met. None are presently proposed.

The wild horses would continue to use the WSA and would benefit from additional protection from disturbance by mineral and energy extraction and ORV use.

VISUAL RESOURCES

With wilderness designation, a slight benefit would occur to the exceptional visual resources of the Muddy Creek WSA because the VRM designation would change from a Class II to the more restrictive Class I. Class I generally provides for only natural ecological changes and, therefore, would reduce the potential for surface-disturbing activities. Some short-term visual impacts would be expected from up to 53 acres of valid mining claim activities; however, not to the degree of significantly degrading the area.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

The entire 31,400 acres would be closed to recreational ORV use as proposed in the San Rafael MFP. Occasional motorcycle riding does take place around the two main access roads, and during low water months recreationists travel in and out of the WSA along the river drainage. This would eliminate the present use of about 50 visitor days/year in the area. Similar areas found in other parts of the San Rafael Resource Area are not proposed to be designated closed; therefore, closure in the Muddy Creek area would not significantly affect ORV recreation use in the region.

Primitive recreation values might be enhanced by wilderness designation by reducing the likelihood of surface-disturbing activities from mineral exploration and development.

By increasing public awareness of the area, designation could result in increased recreation use of the WSA. Judging from the WSA's site characteristics, population distribution about the site, and availability of similar sites, visitation could increase from the present 150 up to about 1,570 visitor days/year.

MUDDY CREEK WSA

WILDERNESS VALUES

Designation and management of all 31,400 acres as wilderness would ensure the preservation of the wilderness values of naturalness and outstanding opportunities for solitude and primitive and unconfined recreation (all are found throughout the WSA). The special features in the WSA (i.e., scenic, geological, ecological, and archaeological values) would also be protected and preserved.

The 31,400 acres would be closed to ORVs. Occasional motorcycle riding (50 visitor days per year) occurs around the WSA's two main access points and within the Muddy Creek drainage at lower water. Tracks within these areas would reclaim as they do after flooding of the river and over time. Some vehicle use associated with grandfathered grazing or valid existing rights for mineral uses could continue.

Wilderness values such as naturalness would benefit from the prevention of a projected 200 acres of surface-disturbing activities. Potential disturbance anticipated would impair wilderness values on 53 acres due to mining claims with valid existing rights.

Outstanding opportunities for solitude and primitive and unconfined recreation generally would be preserved. The entire 31,400 acres meet the criteria for outstanding solitude and primitive and unconfined recreation. Hiking, horseback riding, river floating, and other primitive types of recreational activities probably would be in increasing demand under wilderness designation, with growing public awareness of the area.

LAND USE PLANS AND CONTROLS

Wilderness designation would not conflict with the *Emery County Zoning Plan* for livestock grazing, but closure to mineral leasing and mining claim location would not be consistent with the mining zone classification in the County Plan. The BLM San Rafael MFP has identified the area for further consideration as an ONA or ACEC. Wilderness designation would be consistent with ONA or ACEC goals, but formal wilderness designation would constitute an amendment to the BLM land use plan. This alternative would not conflict with State plans for in-held lands if 640

acres of State land in the WSA and 1,920 acres of State land adjacent to the WSA were exchanged for other lands outside the WSA.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low in the foreseeable future, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims or income associated with possible uranium mining in the distant future would be lost.

Livestock use and ranchers' income would continue as at present with \$29,920 annually of livestock sales and \$7,480 of ranchers' returns to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide), but could increase to about \$6,437 per year.

The loss of 1,600 acres now leased would cause an eventual loss of up to \$4,800 per year of lease fees to the Federal Treasury. In addition to these lease fees, any potential fees and royalties from new lease production could be foregone. The loss of 8,680 acres potentially available for future oil and gas leasing would cause a potential loss of \$26,040 in Federal lease revenues.

There are presently no commercial outfitters using the WSA and little, if any, potential for such income related to the Muddy Creek WSA. It is concluded that the local economic impact of this alternative would be insignificant.

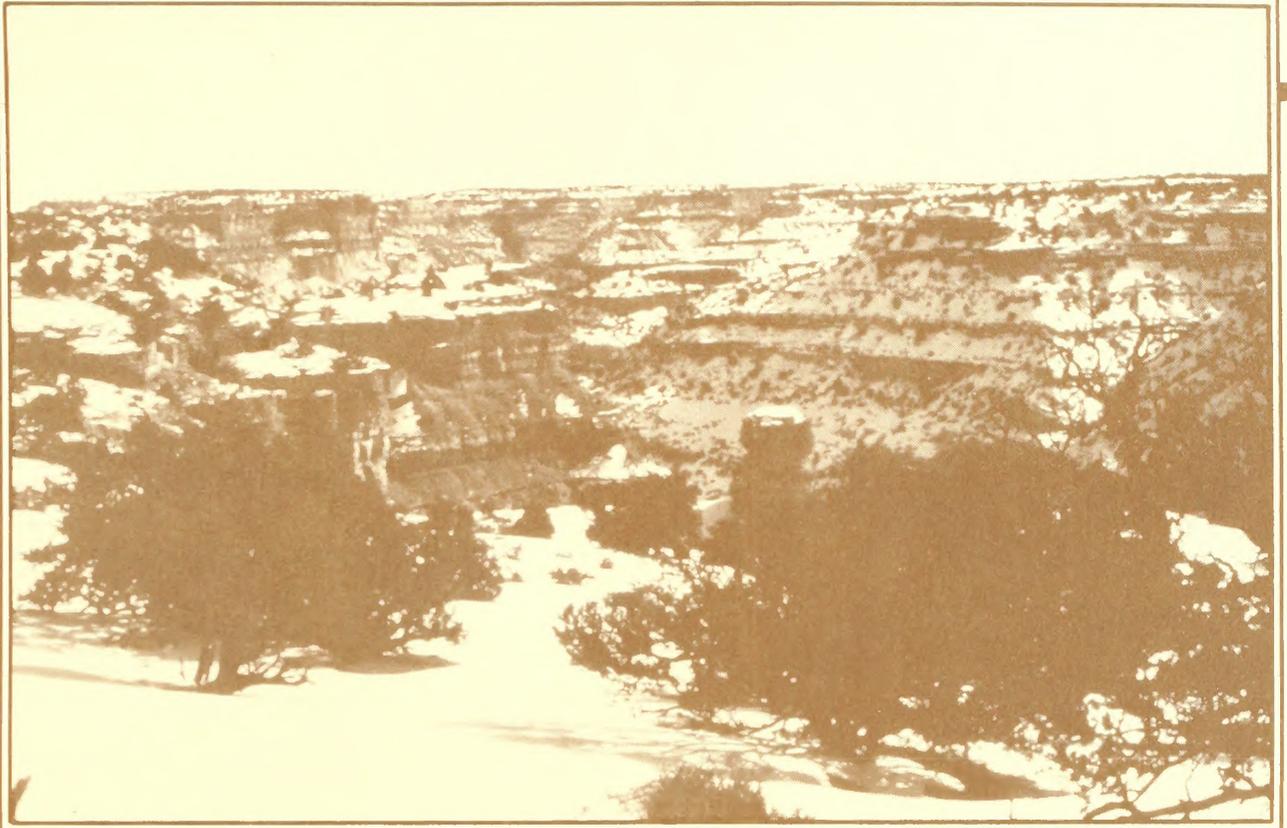
BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.

MUDDY CREEK WSA

- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States (Map)*. Reston, Virginia.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January 1982. U.S. Government Printing Office, Washington, D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan, 1980 SCORP*. Salt Lake City, Utah. p. 157.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Devils Canyon WSA



DEVILS CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	1
Alternatives Considered and Eliminated from Detailed Study	1
Alternatives Analyzed	1
No Action Alternative (Proposed Action)	1
All Wilderness Alternative	3
Summary of Environmental Consequences	5
AFFECTED ENVIRONMENT	7
Air Quality	7
Geology	7
Soils	7
Vegetation	7
Water Resources	9
Mineral and Energy Resources	9
Wildlife	12
Forest Resources	12
Livestock and Wild Horses/Burros	13
Visual Resources	13
Cultural Resources	13
Recreation	13
Wilderness Values	14
Land Use Plans and Controls	16
Socioeconomics	16
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	17
Analysis Assumptions and Guidelines for All Alternatives	17
No Action Alternative (Proposed Action)	18
All Wilderness Alternative	21
BIBLIOGRAPHY	27

DEVILS CANYON WSA (UT-060-025)

INTRODUCTION

General Description of the Area

Devils Canyon Wilderness Study Area (WSA) is in the San Rafael Swell region of Emery County, Utah. It contains approximately 9,610 acres of BLM-administered land. The WSA is of a rectangular configuration, roughly 10 miles east-west and 4 miles north-south.

Devils Canyon is characterized by a rugged, twisting canyon, fingered with several tributary drainages. Elevations in Devils Canyon range from 6,000 feet in the bottom and up to 7,000 feet on top. Devils Canyon and some of its side drainages have acute pour-offs and narrow, twisting routes.

Surrounding Devils Canyon are rolling and colorful mesas. The southwestern portion of the WSA consists of sparsely vegetated pink, red, cream, and purple soils. Elevation in this area averages 6,200 feet. The northeastern part of the WSA is heavily vegetated and consists of rounded knobs and flat top benches. Elevations within the WSA range from 6,200 to 7,400 feet.

The WSA is adjacent to Interstate-70 (I-70) on the north, running parallel for approximately 7 miles. It is situated on the south side of the Interstate and is bordered by the Justensens Flat road on the east, a portion of the Kimball Draw road on the south, and State land on the west. The nearest towns are Emery (12 road miles), Ferron (20 road miles), and Castle Dale (28 miles), all to the north of the WSA.

The area has an arid to semiarid desert climate. Average precipitation ranges from 8 to 10 inches and temperatures range from 15 to 100 degrees Fahrenheit (F). About 15 inches of snow fall between October and April.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the San Rafael Swell region are discussed in Volume I. No specific issues pertaining to the Devils Canyon WSA were identified through formal public scoping.

Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in individual analyses.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for consideration other than those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (9,610 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE (PROPOSED ACTION)

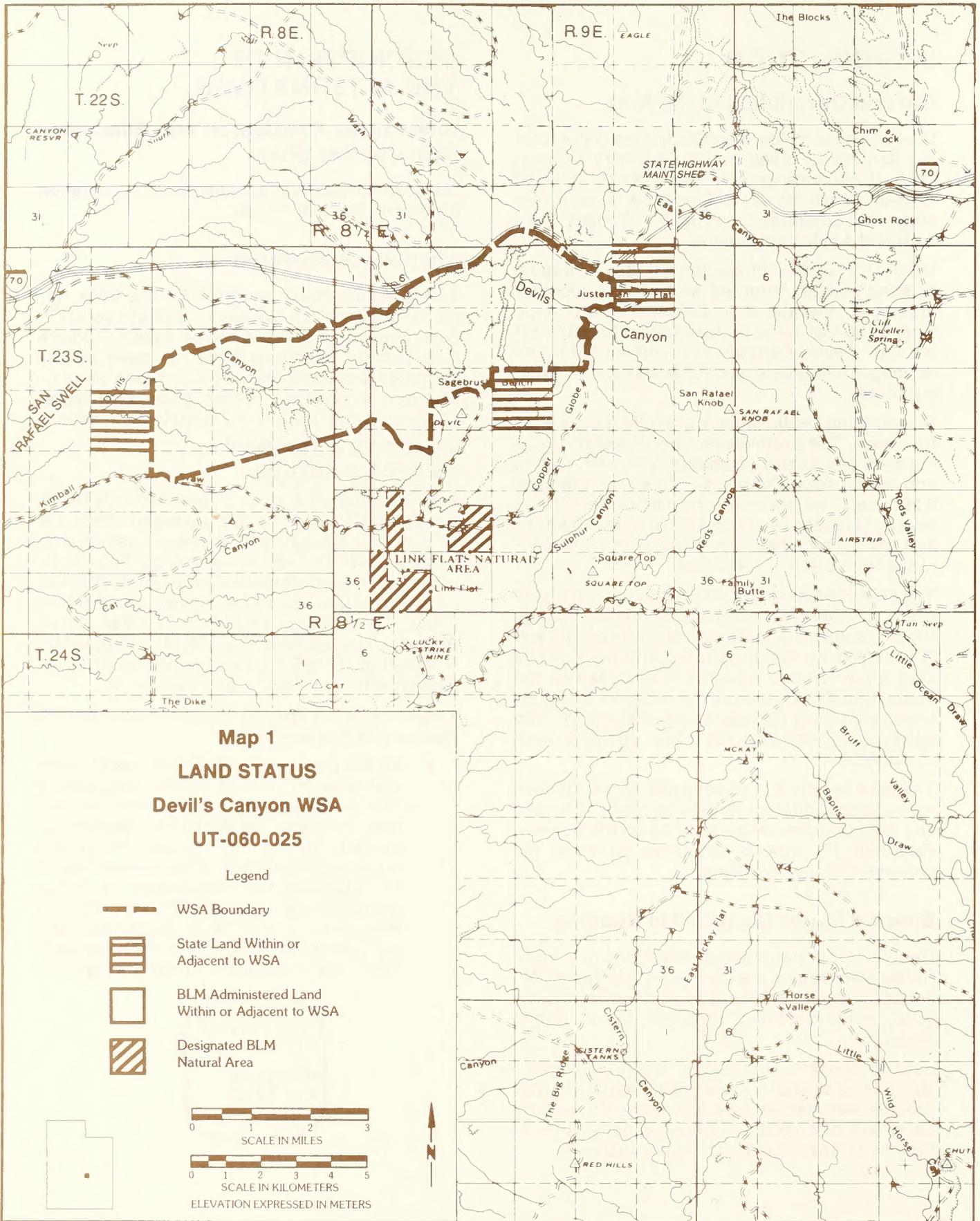
With this alternative, none of the 9,610-acre Devils Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the San Rafael Resource Area Management Framework Plan (MFP) (USDI, BLM, 1979a) and the future San Rafael Resource Management Plan (RMP) scheduled for completion in 1988. No State or private lands are located within the WSA (refer to Map 1).

The following are specific actions that would take place under this alternative:

- All 9,610 acres would remain open to mineral location (mining claims) and sale of rock materials. Development work, extraction, and patenting would be allowed on 27 existing mining claims (600 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809). Existing oil and gas leases (6,250 acres) and future leases could be developed under Category 1



DEVILS CANYON WSA



DEVILS CANYON WSA

(standard stipulations) on about 3,075 acres and Category 3 (no surface occupancy) on about 6,535 acres.

- The present domestic livestock grazing use would continue as authorized in the MFP (301 Animal Unit Months [AUMs]). Use and maintenance of the developed facilities (one gap fence and one reservoir) would continue without concern for wilderness values. New rangeland developments could be implemented without wilderness considerations. None are currently planned.
- Developments for wildlife, water resources, etc., would be allowed without concern for wilderness values if in conformance with the applicable BLM land use plan. None are currently planned.
- The entire WSA would be open to vehicular use, and new access roads would be allowed if needed in the future.
- The entire 9,610-acre area would continue to be closed to commercial woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II on all 9,610 acres. The majority of the WSA would continue to be managed as part of the I-70 scenic corridor to protect scenic values.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate without concern for wilderness values.

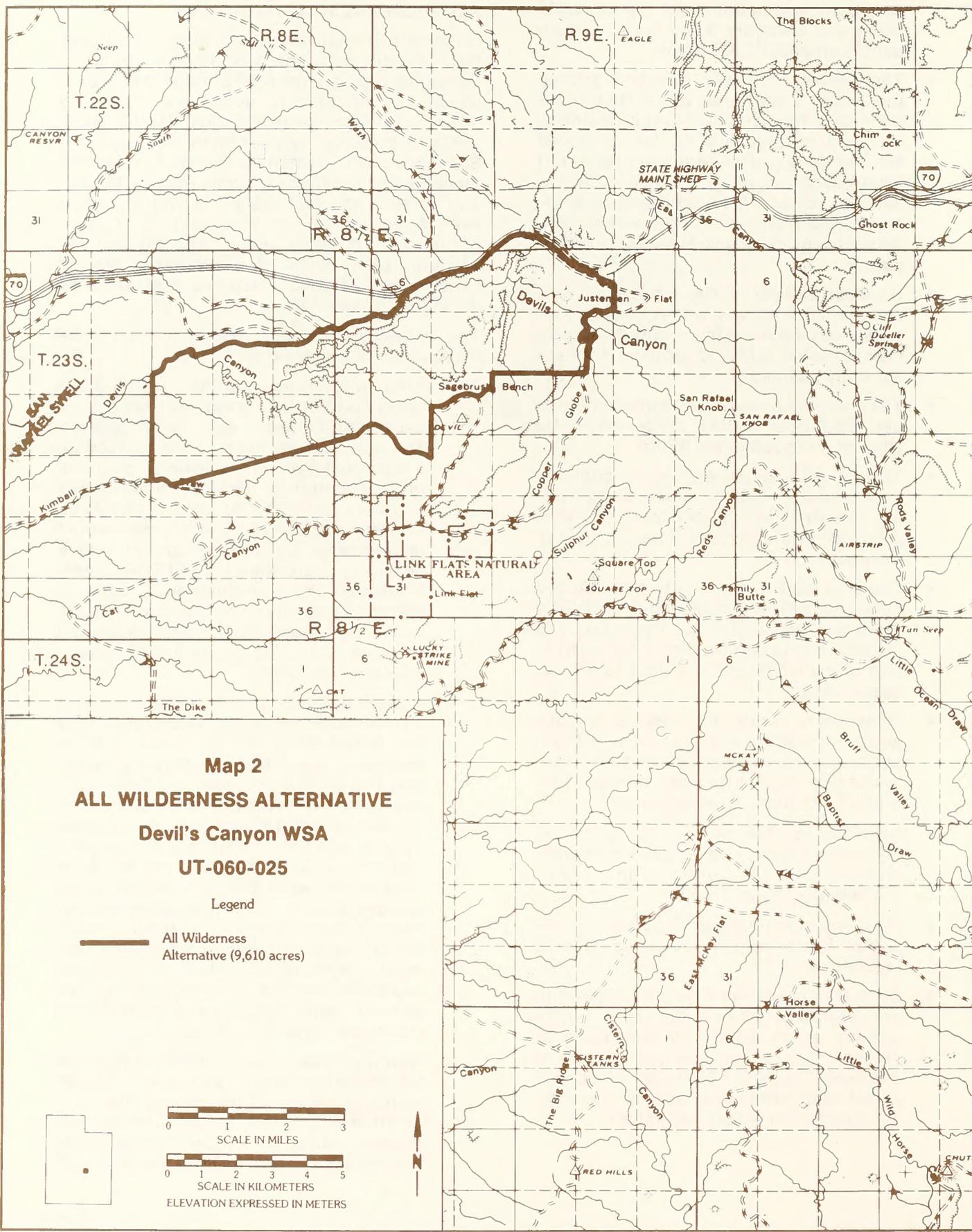
ALL WILDERNESS ALTERNATIVE

Under this alternative, all 9,610 acres of the Devils Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. No State lands are located in the WSA; however, there are three sections adjacent (refer to Map 1). The three State sections likely would not be exchanged. (Refer to Volume I for further information on State lands.) The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 9,610 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 600 acres of existing mining claims that may be determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with wilderness as a consideration. Existing oil and gas leases involving about 6,250 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown.
- Present domestic livestock grazing would be allowed to continue as authorized in the San Rafael MFP. The 301 AUMs on three allotments in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland developments existing at the time of designation (in this case one gap fence and reservoir) could continue in the same manner as in the past, based on practical necessity and reasonableness. After designation, new developments (none are planned) would be allowed on a case-by-case basis if necessary for rangeland and/or wilderness resource protection and management, if consistent with wilderness protection standards (refer to Appendix 1).
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if

DEVILS CANYON WSA



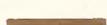
Map 2

ALL WILDERNESS ALTERNATIVE

Devil's Canyon WSA

UT-060-025

Legend

 All Wilderness Alternative (9,610 acres)

 SCALE IN MILES

 SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS

DEVILS CANYON WSA

authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). Except for the Justensen Flat Reservoir, which retains little water due to siltation, no water resource facilities or treatments are located in the Devils Canyon WSA, and none are currently planned.

- Wildlife transplants or improvements would be allowed after designation only if they are compatible with wilderness values. None are existing or planned in this WSA.
- The entire 9,610-acre area would be closed to vehicle use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. The approximately 2 miles of the Devils Canyon drainage and about 1,680 acres traditionally used by off-road vehicles (ORVs) in the area would not be available for vehicular use except as indicated above. About 8 miles (or 35 percent) of the WSA boundary follow existing gravel and dirt roads which would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 9,610-acre wilderness. As part of that plan, it is assumed that, except for the 4 miles of WSA boundary adjacent to I-70, a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface. Along I-70, the boundary would be the edge of the designated highway right-of-way.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned. Commercial harvest of pinyon-juniper for firewood, fenceposts, or Christmas trees in the WSA is not allowed.
- Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.

- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resource. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison.

DEVILS CANYON WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES DEVIL'S CANYON WSA

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (9,610 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for energy from low temperature geothermal sources and for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 3 million barrels of oil from tar sand, 700,000 tons of potash, 5 million tons of gypsum, 100,000 tons of manganese, and 50,000 tons of copper. Long-term potential for recovery of 1,000 tons of uranium oxide is high.	Oil, gas, geothermal energy, oil from oil shale, potash, and gypsum likely would not be recovered. Assuming a worst-case analysis, the recovery of locatable minerals would also be foregone. Due to the low likelihood of recovery of these minerals, however, the loss of development opportunity would not be significant, with the possible exception of loss of recoverable uranium.
Wildlife	About 2.7 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 301 AUMs and maintenance of existing developments would continue. New developments could be allowed; however, none are now proposed.	Grazing of 301 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 256 acres.	Visual quality could be impaired on up to 50 acres.
Recreation	ORV use would continue in the WSA, including 2 miles of ways. Overall recreational use could increase from the present 950 visitor days per year to 1,420 over the next 20 years. Up to 256 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA would be closed to ORV use. Primitive recreational use could increase due to publicity associated with wilderness designation, but overall use would decrease by about 915 visitor days per year as a result of closure to ORV use.
Wilderness Values	Wilderness values could be lost on up to 256 acres (2.7 percent of the WSA).	Wilderness values would be protected, except on up to 50 acres (0.5 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , and the current BLM San Rafael MFP.	This alternative would not be consistent with Emery County's zoning. Designation would constitute an amendment of the BLM San Rafael MFP.
Socio-economics	Annual local sales of less than \$12,615 and Federal revenues of up to \$19,170 would continue. An additional \$10,080 per year in Federal revenue could be derived from leasing of presently unleased areas.	Annual local sales of less than \$8,413 and Federal revenues of up to \$420 could continue, but local sales of less than \$3,752 related to ORV recreation and Federal revenues of up to \$28,832 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

AFFECTED ENVIRONMENT

This section briefly describes the affected environment. Unless otherwise indicated, information for this section was taken from the San Rafael Unit Resource Analysis (USDI, BLM, 1979a) and other BLM documents and files.

Air Quality

The WSA is a Prevention of Significant Deterioration (PSD) Class II attainment area and currently meets Class II standards of air quality classification (1977 Clean Air Act amendments). The nearest Class I area is Capitol Reef National Park, about 30 miles south. Canyonlands National Park, another Class I area, is about 54 miles southeast of the WSA.

Potential pollution sources include industrial and vehicular emissions originating primarily from the Castle Valley of Emery County. A large point source includes powerplants in the Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles.

Geology

The Devils Canyon WSA is located along the western flank of the San Rafael Swell. Elevations in the WSA range from 6,200 to 7,400 feet. During the Eocene period the area began to uplift, creating a bulge in the existing formations. A period of nondeposition and erosion began, carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent north-trending uplift on the Colorado Plateau.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations outcropping in the WSA range from the Jurassic-Triassic Kayenta Sandstone to the Jurassic Carmel Formation. The formations dip to the west at less than 10 degrees.

The Kayenta Formation is found in the far eastern portion of the WSA. It is composed of red argillaceous sandstone, cross-bedded in part with red and green shale and siltstone-pebble conglomerate.

Navajo Sandstone, another colorful formation, is found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-

bedded sandstone. Tan, gray, orange, and yellow colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are caves, buttes, and knolls.

The Carmel Formation forms the outer rolling terrain of the WSA. It consists of brown to gray sandy limestone, red thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

Soils

The WSA contains two general soil mapping units differentiated by canyons and benches. Wind is a minor erosive agent, with water actions moving the most soil. Although erosion potential is low, ground cover and exposed bedrock, coupled with intensive summer thunderstorms, can create locally severe erosion problems. This is especially true on steep slopes and in exposed wash channels. Table 2 describes soil characteristics and land types and Table 3 describes erosion condition.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock outcrop	35	3,363	0.0	0
Shallow loamy soils on sloping structural benches and ledges	40	3,844	1.0	5
Moderately deep and deep loamy soils on gently sloping structural benches and mesas	15	1,442	0.1	1
Deep stony soils on steep canyon sides	10	961	1.0	10
Totals	100	9,610		

Source: Hansen, 1985.

Vegetation

The dominant vegetation type in the WSA is pinyon-juniper. It is found on foothills and mesas and other areas of relatively high elevation and

DEVILS CANYON WSA

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/ acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	0
High	10.0	0	0	0	10	961	9,610
Medium	5.0	0	0	0	40	3,844	19,220
Low	1.0	50	4,805	4,805	15	1,442	1,442
Very Low	0.1	15	1,442	144	0	0	0
None	0.0	35	3,363	0	35	3,363	0
Totals		100	9,610	14,949	100	9,610	130,272

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.5 under present conditions; 2.6 if disturbed.

precipitation. The pinyon-juniper type stops at lower elevations due to low precipitation, high temperatures, and salty substrate.

The desert-shrub vegetation type is found on gravelly, clayey benches and gently sloping sandy lowlands. Semidesert shrubs belonging to the Chenopodiaceae and Compositae families dominate the desert-shrub vegetation type. Major shrubs are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandhill muhly, blue grama, and globemallow.

The grassland vegetation type occurs in a few scattered, isolated areas. Other grasses include western wheatgrass, Fendler threeawn, needle-and-thread, and squirreltail.

The saltbush vegetation type is found at the lower elevations and is associated with saline and/or alkaline soils. Dominant species are shadscale, Castle Valley clover, mat saltbush, and fourwing saltbush.

There are no riparian vegetation areas within the WSA. Table 4 shows existing vegetation types.

Five candidate species under review by the U.S. Fish and Wildlife Service (FWS) for threatened or endangered status (*Hymenoxys depressa*, *Pediocactus despanii*, *Schoenocrambe barnebyi*, *Sphaeralcea psoraloides*, and *Psoralea polydenius* var. *jonesii*), one proposed endan-

gered species (*Cycladenia humilis* var. *jonesii*), and two listed endangered plant species (*Eriogonum maguirei* var. *maguirei* and *Sclerocactus wrightiae*) may occur in or near the WSA.

The Devils Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper	8,456	88
Desert shrub-saltbush	1,154	12
Total	9,610	100

Source: USDI, BLM, 1979a.

DEVILS CANYON WSA

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	7,688	80
Galleta-threeawn shrub	1,922	20
Total	9,610	100

Source: USDI, Geological Survey 1978.

Water Resources

There is one major drainage within the WSA, Devils Canyon, with several tributary drainages associated with it. The Justensen Flat Reservoir is the only known water source in the WSA, although there may be intermittent seeps in the bottom of Devils Canyon drainage. The pond is silted and retains little water. No water quality data are available.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy (DOE), had each WSA independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI) (1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3 was assigned to the Devils Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR applies to 75 to 100 percent of the tract (9,610 acres) evaluated by SAI. Although the uranium/vanadium favorability of the WSA was estimated to be high, the WSA was assigned an OIR of 3 because the favorable host rocks are deep below the surface. Table 6 portrays the ratings for the individual energy and mineral resources.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c4	Less than 10 million barrels of oil
Uranium/ Vanadium	f4	c2	Greater than 1,000 tons of uranium oxide
Coal	f1	c4	None
Geothermal	f2	c1	Low temperature
Hydropower	f1	c4	None
Copper	f2	c2	Less than 50,000 tons
Manganese	f2	c1	Less than 100,000 tons of 40-percent manganese
Potash	f2	c2	Less than 1 million tons

Source: SAI, 1982³.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³SAI did not rate gypsum; however, BLM has added text information.

as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA contains deposits of vanadium and manganese that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

No leasable minerals are currently being produced in the Devils Canyon WSA.

Oil And Gas

There are no existing mineral leases in the Devils Canyon WSA other than oil and gas. Other leasable minerals produced regionally include potash and coal.

The SAI favorability rating indicates that a low potential exists within the WSA for less than 10

million barrels of oil or less than 60 billion cubic feet of natural gas in-place. Less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas are considered to be recoverable. Positive evidence of resource occurrence is located some distance away in a deposit that may be unrelated to the geology of the Devil's Canyon area.

The San Rafael Swell is a structural trap. The interior of the Swell has been eroded away, probably allowing any petroleum contained in the structure to escape. The Swell could only serve as a trap for formations below the Hermosa, the lowest formation stratigraphically exposed in the Swell. The Ferron Gas Field, 11 miles northwest of the WSA, is an anticlinal structural trap. The field is currently producing and has produced 8.4 million cubic feet of natural gas and 38,771 barrels of petroleum. The field's producing formation does not occur in the WSA. The Last Chance Gas Field, 18 miles to the southwest, is also an anticlinal trap that is currently shut-in.

Unlike structural traps, stratigraphic traps result from a change in the permeability of the rock. Examples include channel sands, sand lenses and pinchouts, and organic reefs. The Grassy Trail Field, 46 miles to the northeast, is an example of stratigraphic traps or changes in the porosity and permeability of the Moenkopi Formation. In this field the petroleum was entrapped and prevented from escaping to exposures in the southeast.

No oil and gas wells have been drilled within the WSA. One well was drilled adjacent to the southern boundary and was plugged and abandoned in 1962. Thus far, oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences in the Devils Canyon WSA would probably be as small pools or fields.

The WSA was included in the Price District Oil and Gas Categories Environmental Analysis Report (EAR) (USDI, BLM, 1975). The results established oil and gas categories as shown in Table 7.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilder-

TABLE 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	3,075	32
2. Open with special stipulations	0	0
3. Open with no surface occupancy ¹	6,535	68
4. No leasing	0	0
Total	9,610	100

Source: USDI, BLM, 1975.

¹Due to visual restrictions included within the I-70 visual corridor.

ness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

There are five post-FLPMA oil and gas leases covering approximately 65 percent (6,250 acres) of the WSA. There are 3,360 acres not leased in the WSA that could be made available for lease in Category 3.

Tar Sand

Approximately 960 acres of the San Rafael Swell Special Tar Sand Area (STSA) are located within the eastern portion of the WSA. There have been no applications to convert oil and gas leases to combined hydrocarbon leases in this area.

Minor tar sand occurrences can be found outside the eastern boundary of the WSA. These deposits may extend into the WSA and would be found within the Navajo and Kayenta Sandstone Formations.

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving

behind the heavy fraction, or tar substance. The San Rafael Swell is estimated to contain 445 to 545 million barrels of oil in-place, with most of it in the Moenkopi Formation. The nearest deposit of Moenkopi to the WSA is in the Family Butte deposit, located over 3 miles southeast, which is a part of the San Rafael Swell STSA. None of the Devils Canyon WSA is in the San Rafael Swell STSA. The Mossback Member of the Chinle Formation is also known to contain small scattered occurrences of asphaltic material (tar sand).

The SAI favorability rating for tar sand indicates a low to moderate potential for small deposits (less than 10 million barrels of oil in-place) occurring in the WSA. It is unlikely that the tar sand within the WSA would be developed due to small-sized deposits and economic factors.

Coal

The WSA is considered geologically unfavorable for coal. Cretaceous coal-bearing strata either never were deposited or have been eroded away. The SAI favorability rating for coal indicates there is no deposit.

Potash

Potash occurs within an evaporite sequence (the Paradox Member) in the Hermosa Formation. The formation is several thousands of feet thick in the area of Moab where potash is produced commercially. To the west, the formation thins considerably and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The low favorability rating indicates that, if deposits occur in the Devils Canyon WSA, they would generally contain less than 1 million tons of potash. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. It is unlikely that the potash resource in the WSA would be developed.

Hydropower

A survey of potential hydropower sites in Utah indicated that no potential sites have been identified in or near the WSA. On the basis of that information, SAI rated the hydropower potential as very low.

Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low temperature thermal waters (between 20 and 90 degrees Centigrade [C]). Water extracted at these temperatures can be used for direct heating

purposes. It seems unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and the lack of nearby potential users. SAI rated the potential as low.

LOCATABLE MINERALS

There are 27 mining claims located in the WSA. They cover approximately 600 acres, totaling about 6 percent of the WSA. None of these claims has been patented and they have probably been located for uranium, copper, and gypsum. Only 7 of the 27 claims appear to have current assessment. There have been no minerals produced from the WSA.

Uranium and Associated Minerals

There are many uranium/vanadium deposits in the San Rafael Swell. These are scattered and range from small to large deposits. They occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback and Church Rock Members. Ore is primarily found in the Mossback Member as tabular deposits in channel sands and as lenticular deposits in the Monitor Butte Member.

The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with the uranium/vanadium include lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable. These metals indicate a hypothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The WSA is within the region's southern uranium belt, which is most favorable for the occurrence of ore deposits. Moderate- and large-size ore bodies are found in the southern belt, which roughly parallels the Muddy and Dirty Devil Rivers (Hawley et al., 1968). The WSA lies between the outcrop belt of the Chinle and Morrison Formations and, although uranium is known from the intervening strata, no uranium occurrences are reported in the area (SAI, 1982). The favorable sources in the Chinle Formation probably underlie the WSA at a depth of about 700 feet along the east side to about 2,000 feet along the west side.

Even though factors for uranium occurrences within the WSA are not positive, SAI rated the

DEVILS CANYON WSA

WSA with a high favorability. The SAI analysis was based on location within a very favorable tract that contains the largest uranium deposits in the San Rafael Swell. The certainty that uranium and vanadium occur, however, is relatively low. It is believed that ore bodies, if found in the WSA, would be small, discontinuous, and at depths presently uneconomical to mine.

Manganese

Manganese deposits in the area are chiefly small and low grade and occur in the Morrison and Summerville Formations. The nearest deposits are about 9 miles west of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation underlies the WSA and, on this basis, the low SAI rating indicates a deposit size less than 100,000 tons of 40-percent manganese. However, SAI indicated that, in fact, the WSA most likely is favorable for only very small accumulations.

Copper

Copper in the San Rafael Swell is usually associated with uranium deposits. The only exception is with the Copper Globe Mine located about 1 mile south of the WSA. The mine produced 2 or 3 tons of ore between 1915 and 1920, but has produced only mineral specimens and jewelry pieces since then.

The SAI favorability rating indicates a low potential for copper deposits in the WSA which, if found, would be small in tonnage (less than 50,000 tons of contained copper).

Gypsum

The Carmel Formation is reported to contain a bed of industrial grade gypsum in the western portion of the WSA. The BLM has given gypsum a favorability rating indicating a moderate potential of occurrence. If a deposit does exist within the WSA, it would be small in tonnage (less than 5 million tons). It is unlikely that any gypsum would be developed due to distance of mines to market and related transportation concerns.

SALABLE MINERALS

Although the potential exists for use of rock materials from the WSA, it is considered to be very low due to limited demand and high availability of these materials elsewhere in more accessible locations.

Wildlife

The Devils Canyon WSA provides habitat for a limited variety of wildlife species. The lack of

perennial water sources limits the many forms of wildlife. During the winter, snow can provide water. Vegetation is also limited due to low density and species composition.

The only big game species present in the WSA is mule deer. Deer can be found in the side canyons and along the ridges and benches north and south of Devils Canyon. The deer are mainly winter visitors due to the lack of water in the summer. Devils Canyon is contained within the Utah Division of Wildlife Resources' (UDWR) Deer Herd Management Unit 29.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, black-tail jackrabbits, wood rats, ring-tails, badgers, Ord kangaroo rats, gray foxes, kit foxes, white-tail antelope squirrels, chipmunks, rock squirrels, bats, mice, and voles.

Habitat for various bird species is found in the WSA. The species' diversity and population sizes are small. Few raptors exist in the WSA, with golden eagle (BLM sensitive species), prairie falcon, American kestrel, ferruginous hawk (candidate species under status review by FWS), red-tailed hawk, and rough-legged hawk being the major species. Chukar and mourning dove may also be found in the WSA.

Mountain lion may occasionally visit the area in the winter to prey on deer. The probability of such an occurrence is low due to the low density of deer.

Several species of snakes and lizards can be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, and western rattlesnakes account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

There are no sensitive, threatened, or endangered wildlife species known to be present in the WSA. None of the area is identified as crucial habitat, and there are no existing or proposed wildlife management facilities or vegetation treatments.

Forest Resources

The dominant forest type is pinyon-juniper woodland. This community is used commercially throughout the Southwest for firewood, fence-posts, and Christmas trees. Because the WSA is remote from populated areas and products are available closer to population centers, the BLM

DEVILS CANYON WSA

does not allow any of these uses in the WSA. There are approximately 8,456 acres of pinyon-juniper woodland in the WSA that could yield about 16,912 cords of pinyon-juniper woodland products if favorable variables (i.e., slope, access, etc.) were present.

Livestock and Wild Horses/Burros

The Devils Canyon WSA contains portions of three livestock grazing allotments, as listed in Table 8. Range improvement projects in the WSA are limited to one short-gap fence and one reservoir. There are no known plans for additional grazing developments within the WSA.

A herd of approximately 10 to 15 wild horses frequents the WSA.

Visual Resources

The Devils Canyon WSA consists of one incised drainage and undulating and colorful tablelands. The canyon and its tributaries are typified by deep narrow sandstone walls alternating from white-buff to dark reds. Devils Canyon, the major drainage of the WSA, contains walls averaging 450 to 550 feet in the northeastern portion, becoming shallower as the canyon drains to the southeast.

The eastern topographic relief, outside of the canyons, consists of rolling mesas, assorted buff sandstone domes, and low cliffs averaging 40 to 150 feet. The western half of the WSA is typified by shallow dissected rounded drainages which appear coarse and grainy, with buff and dark-brown colors being prominent.

The WSA is classified as having Class A scenery characteristic of the physiographic region. The

entire WSA is in the foreground/midground zone visible from boundary roads. The sensitivity level has been rated high over 9,129 acres of the WSA and medium on the other 481 acres. A large part of the WSA is within the I-70 scenic corridor, where no development is allowed (USDI, BLM, 1979a) in order to protect the scenic values along I-70. Based on these factors the entire WSA is within a VRM Class II management area.

Cultural Resources

No cultural inventory has been made of the area, and no cultural sites within the WSA have been documented.

One pictograph site has been reported to be adjacent to the WSA near Kimball Wash Spring and another in Devils Canyon within the WSA. No National Register sites, existing or proposed, occur in the WSA.

Recreation

The majority of the recreational use in the WSA occurs in the Justensen Flats, Sagebrush Bench, and Kimball Draw areas. Recreational activities include ORVs, vehicular camping, and wild horse viewing. The San Rafael MFP (USDI, BLM, 1979a) indicates that the WSA would be open to ORV use in accordance with 43 CFR 8340.

The spring months, especially Easter and Memorial Day, receive the greatest amount of visitation. On these days an average of about 100 people have been observed associated with ORV use in each of the Justensen Flats, Link Flats, and Copper Globe areas. The Kimball Draw area is used moderately by ORVs. The terrain is flat to rolling tables with sparse to moderate vegetation

TABLE 8
Livestock Grazing Use Data

Allotment	Class of Livestock	Number of Operators	Season of Use	Total AUMs ¹	Total Acres ¹	Acres in WSA	Percent of Allotment in WSA	AUMs in WSA
South Sid & Charley	Cattle	1	11/16 to 06/15	952	18,638	1,270	7	64
Lone Tree	Cattle	10	12/16 to 05/31	5,271	104,523	8,330	8	236
Globe Link	Cattle	1	11/01 to 04/30	600	7,514	10	1	1
Totals		12				9,610		301

Source: USDI, BLM, 1979a.

¹These are totals for the allotments on Federal land. The WSA incorporates only a portion of these allotments.

DEVILS CANYON WSA

coverage. Several established ORV (motorcycle) trails lead toward Devils Canyon drainage and various wild horse trails. The eastern and western portions of the Devils Canyon drainage are explored frequently by ORVs (but limited to about 2 miles due to terrain). Total ORV use in the WSA is estimated to be 600 visitor days over Easter weekend and an additional 300 visitor days during the remaining season of use. These estimates are based on field observations.

Opportunities for hiking and backpacking exist within the Devils Canyon drainage. Access to the canyon is relatively easy with a high-clearance type vehicle. There is no water available in the canyon, and temperatures in the summer may reach over 100 degrees. Thus, hiking would be difficult. Travel within the WSA would be restricted in the Devils Canyon drainage where routes to the upper reaches are limited. Numerous game trails surround the Devils Canyon drainage. These trails have the potential of being used as hiking trails. It is not known if, or how many, people use the Devils Canyon WSA for hiking, backpacking, or other primitive types of recreational activities. It is estimated, however, that there are less than 50 visitor days of annual use for these activities.

Total annual recreation use is about 950 visitor days in the WSA.

Wilderness Values

SIZE

The WSA (9,610 acres) is of sufficient size to enhance the wilderness values present. In some places, however, its narrow width restricts some wilderness opportunities and does not provide solitude. The WSA is about 10 miles long (east to west) and 2 to 3 miles wide (north to south).

NATURALNESS

The major imprints surrounding the Devils Canyon WSA have been excluded by boundary determinations during the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980). What remains of note is a reservoir, gap fence, and an accumulation of ORV trails and camp areas.

The reservoir is located in the Justensen Flats area of the WSA. It has silted in over the years and holds little or no water. The gap fence is along the southeast boundary of the WSA and is approximately 0.25 mile long. Both the reservoir and fence are substantially unnoticeable.

Extensive ORV use and vehicular traffic have caused imprints (such as trails and camp sites) in the Justensen Flats, Sagebrush Bench, and

Kimball Draw areas of the WSA.

The most heavily used areas are Justensen Flats and the Devils Canyon entrance where six to eight trails and several camp areas have become well established by heavy traditional spring and fall use. It is not uncommon to see campers and trailers within this area during the spring and fall months. BLM recreation use statistics have been collected in this area since 1976 and have shown a steady number of users each year. In 1983 over 100 people and 10 camping units were recorded on Justensen Flats during Easter weekend. The impacted area covers about 660 acres.

The Sagebrush Bench area is used by recreational ORVs and individuals looking for wild horse herds. An old road leads from Link Flats to an open valley and airstrip. Some vehicular camping takes place in the valley, but mostly trails exist where ORVs have explored. Recreational use in this area is at least half that occurring in Justensen Flats; however, it has become a special traditional spot for those who make the effort to get there. There are not as many ORV trails in the area as are found on Justensen Flats. In this area, about 60 acres have been affected within the WSA.

The Kimball Draw area has rolling topography spotted with pinyon and juniper or brush. Access to the area is obtained easily by way of Kimball Draw and many recreationists travel into the area in search of wild horses or for ORV play. They use the old seismic line that makes up the WSA's southern boundary and venture into the WSA throughout the vegetation towards the Devils Canyon drainage. Impacts in the area by ORVs are not as concentrated as those found in Justensen Flats and consist mainly of two-wheel tracks throughout the vegetation. Approximately 960 acres have been accessed by ORVs in this area of the WSA.

These imprints combined cover approximately 18 percent (1,680 acres) of the WSA. Of the 18 percent affected by existing ORV use, about 7 percent (660 acres) have been significantly impacted and do not meet the naturalness criterion for areas under wilderness review, while 11 percent (1,020 acres) does meet the naturalness criterion. Overall, 93 percent (8,950 acres) of the WSA meets the naturalness criterion.

SOLITUDE

Portions of the WSA offer outstanding opportunities for solitude. These areas are limited to 3 miles of the western portion of the Devils Canyon drainage and several of the canyon's south-

easternmost fingers. In these areas the steep cliffs and twisting character of the canyon effectively shroud lines of sight and suppress sounds for a substantial distance. Offsite intrusions and influences are essentially nonexistent within these specific areas.

Approximately 4 miles of the WSA's northernmost boundary consists of the I-70 right-of-way (including the Devils Canyon view area). I-70 parallels the WSA and makes a significant grade to the Moore Road-Copper Globe turnoff in the east and Salt Wash to the west. I-70 receives a large volume of traffic, especially in the form of semitrucks and trailers. A Utah Department of Transportation study revealed that over 800,000 people traveled along I-70 through the San Rafael Swell in 1971. Since the study, I-70 has increased its travel usage and more than 2,500 vehicles a day are expected to travel I-70 across the Swell by 1990 (Utah Department of Transportation, 1984).

There are specific areas within the WSA negatively influenced in terms of solitude by the continual traffic noise of I-70. These areas include: (1) the northern portion from the right-of-way to the Devils Canyon drainage; (2) the Justensen Flats area; and (3) an area 2 miles within the Devils Canyon drainage, plus specific points throughout the drainage from the eastern border. There are other areas, such as the high country on the southern side of Devils Canyon and the southwestern portion of the WSA, where sounds of I-70 are present. These areas, however, receive more of an intermittent level of sound that can be heard at times, but it is not as constant or distinguishable as that in the north.

Justensen Flats, approximately 600 acres in size, is situated along a portion of I-70 where the traffic is visible to the extent that one can clearly identify each vehicle as it travels past. I-70 makes a steep incline here and constant noise from vehicles can be heard. The majority of the area is flat, open grassland, spotted with clusters of pinyon and juniper trees. These three factors combined can negatively affect the ability to find solitude in this area.

The northern portion of the WSA, from the I-70 right-of-way to the Devils Canyon drainage, is also an area where opportunities for solitude are negatively affected. The area is approximately 4 miles long and varies in widths of 1 to 300 feet wide. Even though vegetation in the area is mostly pinyon and juniper trees, due to the closeness of I-70 and its constant traffic noise, solitude is nonexistent.

Within the Devils Canyon drainage there are

specific points where the constant travel along I-70 can be heard to a degree that it becomes distinguishably dominant over the area's natural sounds (i.e., wind, insects, etc.). Temperatures and wind conditions can influence the sound level, creating other areas beyond the specific points listed to be affected.

The Devils Canyon drainage is one of the WSA's few places where recreational opportunities are outstanding and probably where the flow of visitors are attracted. It is also the main focal point and makes up the most interesting terrain of the WSA. The canyon is narrow and confined. Part of the canyon has solitude, but on the east end the area affected by I-70 sounds within the canyon is approximately 1,100 acres. In addition, only part of the canyon, (about a 1-mile-wide strip of land along the southern side of the WSA) is free from the noise influence of I-70.

The WSA's size and relatively narrow configuration, plus the noise impacts mentioned above, do not aid in providing solitude. These, in fact, emphasize the lack of outstanding solitude qualities due to the sounds of continual traffic on I-70 outside of the WSA.

In summary, within 73 percent of the WSA (7,050 acres), an area roughly 9 miles long and 1.25 miles wide, the opportunities for solitude meet the outstanding criterion for areas under wilderness review. The remaining 27 percent (2,560 acres) does not meet the criterion.

PRIMITIVE AND UNCONFINED RECREATION

The WSA contains opportunities for primitive and unconfined recreation on 3,200 of the 9,610 acres, mostly for hiking and backpacking. These activities primarily would be confined to either the eastern portion of the WSA or within the Devils Canyon drainages because of the rugged and incised character of the topography splitting the WSA. Game trails could be used as a means of access outside of the drainages. Hunting and horseback riding also would be constrained because of the lack of game, rugged topography, and lack of water sources.

Primitive recreation opportunities in the WSA are limited, with hiking and sightseeing being the most outstanding.

SPECIAL FEATURES

The most outstanding features of this unit are the scenic and geologic values found in Devils Canyon and a small wild horse herd of approximately 10 to 15 animals that frequents the WSA.

Land Use Plans and Controls

There are no State or private lands within the WSA. There are three State-owned lands adjacent to the WSA.

I-70 is adjacent to the WSA on the north for approximately 7 miles. Rights-of-way were issued to the Bureau of Public Roads (now Federal Highway Administration) for the Utah Department of Highways along this particular border of the WSA. Physical and legal access to the WSA is by a BLM-maintained road through Justensen Flats, a county-maintained road through Kimball Draw, and I-70 where it parallels the unit for 7 miles.

There are no contiguous lands under consideration by other agencies for wilderness.

The area is identified for multiple-use management by the BLM. It is managed in accordance with the San Rafael MFP (USDI, BLM, 1979a).

In the *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984), the WSA area is shown as M&G-1 (mining and grazing).

Socioeconomics

DEMOGRAPHICS

The WSA is located in the south-central portion of Emery County. Activities in this part of the San Rafael Swell are significant primarily to Emery County, with some minor concern to Carbon County. Emery County had a population of 12,900 in 1982, not quite 1 percent of the State population (University of Utah, Bureau of Economic and Business Research, 1982). Most of the population occurs in Castle Valley, the northwestern part of the county. There are two service centers in northwestern Emery County: Castle Dale, the county seat (1980 population of 1,910) and Huntington (1980 population of 2,316). Other towns in Castle Valley are Elmo (1980 population of 300), Cleveland (1980 population of 522), Orangeville (1980 population of 1,309), Ferron (1980 population of 1,718), and Emery (1980 population of 372). The Town of Green River is located in the southeastern part of the county and had a population of 1,282.

Emery County contains 4,449 square miles of land. About 82 percent of the county is owned by the Federal government, 11 percent by the State, and 7 percent by private residents.

EMPLOYMENT

Statistics (refer to Table 9) indicate that almost half of the county income and about 40 percent of

the employment is from mining, mostly for coal. Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important sources of employment and income. Agriculture accounts for 0.6 percent of the county income and less than 1 percent of the total employment.

TABLE 9
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate	1	1
Services	2	6
Other	-	-
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

During 1970-1980, Emery County experienced the State's largest percentage change in population, increasing by 109.7 percent (5,137 to 11,451). This increase was brought about by construction of the powerplants mentioned before and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at various times during the county's history. Since 1982 the local coal industry has been in a slump. Despite a 17-percent decrease in employment

between 1981 and 1983 it remains the largest employer in the area (Utah Department of Employment Security, 1981 and 1983).

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, mineral leasing, livestock production, and recreation. Table 10 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

The WSA has 27 mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Twelve livestock operators have a total grazing privilege of 301 AUMs within the WSA. If all this forage were utilized, it would account for \$6,020 of livestock sales, including \$1,505 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use and related local expenditures are low. Motorized recreational use is moderate. Related local expenditures are low and insignificant to the local economy. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Devils Canyon WSA is estimated as about 950 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Emery County.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 10).

Oil and gas leases in the WSA cover approximately 6,250 acres. At \$3 per acre, lease rental fees generate up to \$18,750 of Federal revenues annually. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

The livestock permittees in the WSA can graze their cattle on up to 301 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can

potentially generate \$420 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

TABLE 10
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	0	\$18,750
Mining Claim Assessment	Less than \$2,700	0
Livestock Grazing	\$6,020	\$420
Woodland Products	0	0
Recreational Use	Less than \$3,895	0
Total	Less than \$12,615	Up to \$19,170

Sources: BLM File Data, Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These

estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (PROPOSED ACTION)

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but would probably be low due to the WSA's rough terrain, development restrictions of the San Rafael MFP (USDI, BLM, 1979a), and low resource potential. The following is a worst-case analysis based on the assumption that minerals may be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium/vanadium, 40 acres; potash, 40 acres; manganese, 10 acres; and geothermal, 6 acres. Combined, this disturbance would total 256 acres. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.)

AIR QUALITY

The WSA would continue to be managed as a PSD Class II area. Disturbance of 256 acres would result in minor increases in fugitive dust emissions. This could contribute slightly to temporary increases in haze conditions generated occasionally in Castle Valley to the north of the WSA.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with locatable minerals (i.e., uranium/vanadium, copper, etc.) and oil and gas exploration and development activities would probably not exceed 256 acres. This would not significantly affect geology.

SOILS

It is estimated that up to 256 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about .5 cubic yards/acre/year. Soil loss on the 256 acres would increase from 128

cubic yard/year to 666 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 541 cubic yards (11 percent) over current annual soil loss.

VEGETATION

The anticipated maximum disturbance of 256 acres would not significantly impact the WSA's sparse vegetation.

Eight candidate, proposed endangered, or endangered plant species occur in or near the WSA. Before authorizing surface-disturbing activities (256 acres potential) the BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, the BLM would consult with the FWS as required by BLM policy (refer to Appendix 4). The BLM would request a biological opinion when appropriate (as required by the Endangered Species Act). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Surface disturbance from mineral and energy exploration and development could impact 256 acres under this alternative, with a soil loss increase of up to approximately 541 cubic yards per year. However this would not affect water resources since water is very limited in the WSA—only a slight increase in turbidity of snowmelt and thunder storm run-off would result. No proposed water developments have been identified for the WSA; thus, impacts to the water resources would be minimal.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same (3,075 acres in Category 1 and 6,535 acres in Category 3) to protect the visual qualities along the I-70 travel route. The wilderness stipulations on 6,250 acres of post-FLPMA leases would be removed, and there would be an additional 3,360 acres available for lease.

The WSA is considered low in potential for oil and gas occurrences, with less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas considered recoverable. These oil and gas resources could be explored and developed without concern for wilderness restrictions. However, due to the anticipated small size of the deposits, rough terrain, and Category 3 restrictions on much of the area, no development is expected under this alternative. Due to these limitations, an estimated 66 percent of the recoverable potential of oil and gas could be foregone should these resources exist in the WSA, although slant drilling techniques may allow additional recovery.

Tar Sand

The tar sand resource (960 acres) in the Devils Canyon WSA could be leased, but not explored or developed due to a Category 3 (no surface occupancy) management restriction. Even without such a restriction, it is unlikely that the tar sand within the WSA would be developed due to small-sized deposits, depth, scarcity of water, and economic constraints. Therefore, no recovery or related surface disturbance for tar sand is predicted.

Potash

The entire WSA would be open to potash leasing. The likelihood of the area being explored or developed is remote due to thicker, richer, and shallower deposits elsewhere.

Geothermal

The entire area would remain open to geothermal leasing. Although leases currently exist, the likelihood of leasing or development is low due to the low potential for geothermal resources in WSA.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire WSA would remain open to mining claim location.

The favorable geologic formation for uranium underlies the WSA at depths from 700 to 2,000 feet. It is believed that surface deposits in the San Rafael Swell have been explored and only sub-surface deposits may be possible. The formation of these deposits are deeper and less favorable on the west side of the WSA.

The potential deposit of up to 5,000 tons of uranium/vanadium, copper (less than 50,000 tons), and manganese (less than 100,000 tons of 40-percent concentrate) could be obtained.

Gypsum has a moderate potential (estimated at less than 5 million tons) for occurrence and

recovery, but it is unlikely to be developed in the foreseeable future due to uncertainties of occurrence, transportation factors, and economic considerations. Should these conditions change, this alternative would allow the Devils Canyon WSA to be further considered for gypsum production in the future.

Due to current market conditions, locatable minerals in the WSA are not expected to be mined within the near future; however, with this alternative they would be available for recovery without wilderness limitations should market conditions change. This is a higher possibility of exploration for and extraction of uranium than the other locatable minerals.

WILDLIFE

With this alternative, wildlife could be affected by an increase in the availability of water through the clean-out and maintenance of one reservoir. No wildlife management facilities or vegetation projects now exist or are planned within the WSA.

Wildlife could be adversely affected by potential surface-disturbing activities on 256 acres. Because the potential for actual development of minerals is low, this type of impact is considered unlikely. Even if disturbance occurred, adverse effects would be considered short term while work was ongoing. There are no sensitive, threatened, or endangered animal species known to occur in the WSA.

FOREST RESOURCES

Since there are a limited source of trees, only occasional use by campers and hikers in the area, and minimal surface-disturbing activities anticipated, there would be no significant effect on forest resources.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP and the subsequent BLM land use plans. The 301 AUMs currently allocated within three allotments are used by livestock of 12 permittees. Since very little use of motorized vehicles is currently being made to manage livestock, little change in livestock management is expected. The 0.25-mile gap fence and one stock reservoir could be maintained without concern for wilderness values. New range developments could be installed but none are now planned. The small herd of wild horses (approximately 10 to 15) would continue use of the WSA as at present.

VISUAL RESOURCES

Scenic values in the area would continue to be managed under VRM Class II guidelines which state that management activities should not visually attract observers' attention and changes should be designed to maintain the natural landscape's shape, size, and color. Most surface-disturbing activities would exceed these objectives, at least until rehabilitation of affected areas was complete.

Scenic values in areas affected by an estimated 256 acres of surface disturbance could be degraded, and VRM Class II objectives would not be met. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized area during the period of activity. Class II VRM objectives would probably not be met during the short term and, even after rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and mining claim activities are located throughout the area (worst-case analysis), visual quality could be reduced in the WSA as a whole. Disturbance from oil and gas activities would not affect visual resources on about 66 percent of the area due to no surface occupancy (Category 3) leasing restrictions.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 256 acres of surface disturbance by mineral exploration and development with this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Generally, there would be no adverse impact to cultural resources, but inadvertent loss or damage could occur in the disturbed areas. There are no known potential or existing National Register sites within the WSA.

RECREATION

The entire 9,610 acres would remain open for ORV use as identified in the San Rafael MFP. Justensen Flats, Sagebrush Bench, and Kimball Draw areas all receive traditional ORV use. Primitive recreation values would be foregone in those areas where potential surface-disturbing activities could take place (256 acres from mineral exploration and development).

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981)

it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 950 current visitor days per year to 1,420 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 50 visitor days per year to about 75 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicles (primarily camper units and motorcycles) would increase from 900 visitor days per year to 1,345 visitor days.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing San Rafael MFP and the pending San Rafael RMP. Expected mineral and energy exploration and development could disturb an estimated 256 acres.

Within the projected disturbed acreage, the outstanding opportunities for solitude and primitive and unconfined recreation (where present) would be foregone. The 9,610-acre WSA contains approximately 7,050 acres of outstanding opportunities for solitude. Outstanding opportunities for primitive and unconfined recreation exist on only 3,200 acres of WSA and are limited to hiking, backpacking, and scenic observations.

Supplemental geologic and scenic values may receive minor impacts due to expected surface disturbance. Oil and gas category restrictions have been placed on 6,535 acres in the northern part of the WSA to protect the scenic values of the area. This is within the I-70 scenic corridor, which was established to keep the scenic quality of this travel route free from development impacts. Overall, wilderness values in about 66 percent of the WSA are expected to remain available; however, in the other 34 percent of the WSA, the existing ORV use and other activities would continue to reduce the wilderness values.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with the *Emery County Zoning Plan* that identifies the area as a potential mining and grazing zone. Plans of other agencies would not be affected. It would also be consistent with plans and policies of the State of Utah as well as the affected BLM land use plan.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources

would remain as at present. If the oil and gas, uranium/vanadium, potash, geothermal, copper, and manganese in the WSA were developed, it could lead to only a small increase in employment and income for Emery County since the potential deposits are expected to be small. Due to present market conditions, the probability of economic development of minerals within the WSA is low, although SAI rates the area as having moderate potential (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no livestock-related economic losses because the existing grazing use (301 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. Future developments would be allowed, although none are presently proposed.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase to only 1,420 visitor days per year over the next 20 years and overall recreation-related expenditures average \$4.10 per visitor day (only a portion of which contributes to the local economy), annual recreation-related expenditures of \$5,822 attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. Fees from existing oil and gas leases could continue (refer to Table 10.) There are 3,360 acres in the WSA open to oil and gas leases that are currently not leased. If leased they would bring up to \$10,080 additional Federal lease fee revenues per year in addition to any future royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Other revenues could be obtained from tar sand, geothermal, and potash leasing, although this is considered unlikely.

Collection of livestock grazing fees (\$420 per year) would continue.

All Wilderness Alternative (9,610 Acres)

As noted in the Description of the Alternatives section, the major changes that could occur in the 9,610-acre area would be related to its withdrawal from mineral location, closure to new mineral leasing and sale, and closure to ORV use. The entire area would be placed in leasing Category 4

(closed to leasing). About 1,680 acres of the WSA are used traditionally by ORV recreationists. This area, along with the remaining 7,930 acres, would be closed to ORV use, except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed, causing an estimated 50 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed, and future leasing of oil and gas would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (50 vs. 256 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, and forest resources would be insignificant for the All Wilderness Alternative, as described for the No Action Alternative. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

The soil resources could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

It is estimated that up to 50 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about 0.5 cubic yard/acre/year. Soil loss on the 50 acres would increase from 25 cubic yards/year to 130 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 105 cubic yards (2 percent) over current annual soil loss.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 50 acres under this alternative. Because of

DEVILS CANYON WSA

the minimal area affected and the lack of perennial water, there would be no significant change from the current situation, and water resources would not be impacted.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Designation of the WSA could have only a small impact on exploration for oil and gas. Post-FLPMA leases (currently covering 6,250 acres of the WSA) and other leases issued would continue to be subject to wilderness stipulations. Unless slant drilling techniques were used in association with existing leases from outside the WSA, undiscovered oil and gas resources could not be explored or produced; however, the potential of the area is low, with less than 3 million barrels of oil or less than 18 billion cubic feet of natural gas considered potentially recoverable. These resources could be foregone. New leases would not be issued. Due to questionable potential and current no surface occupancy restrictions on part of the WSA, no oil and gas production is likely with the No Action Alternative; therefore, the All Wilderness Alternative would not preclude any realistic opportunities for oil and gas development in the Devils Canyon WSA.

Tar Sand

The potential for the occurrence of small tar sand deposits exists within the WSA. As with the No Action Alternative, no development of the tar sand resource is likely. Less than 10,000,000 barrels of oil in-place exist and, due to the depth, in-situ recovery methods would be required. With in-situ methods only 30 to 40 percent of the oil (3,000,000 barrels) could be recovered, and this amount would be foregone. It is noted, however, that existing BLM land management restrictions do not allow surface occupancy within the WSA to protect the I-70 scenic corridor. Thus, exploration and development would not occur with either the No Action or the All Wilderness Alternative.

Potash

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and shallower deposits elsewhere. It is assumed that there are 700,000 tons of recoverable potash that would be foregone. Wilderness designation would prevent leasing of the WSA for potash; however, this would have no significant impact since exploration or development for potash is unlikely.

Geothermal

No geothermal leasing would occur, but this would not be significant due to the low potential for this resource.

Locatable Minerals

There are 27 mining claims covering 600 acres (6 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid existing rights, although operations would be required to follow unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void. Only seven of the 27 claims in the WSA appear to be current in assessment. With wilderness designation the entire 9,610 acres would be closed to new location.

Uranium/vanadium-bearing strata are known to occur in the WSA; however, due to the depth of overburden, the favorable host rocks are well below the surface and economic costs for recovery would be high. The potential exists for more than 1,000 tons of recoverable uranium oxide to be foregone.

Manganese (less than 100,000 tons of 40-percent concentrate), copper (less than 50,000 tons), potash (less than 1 million tons), and gypsum (less than 5 million tons) are other deposits rated as being low to moderate in potential for occurring in the WSA. The gypsum-bearing strata in the western portion of the WSA are not economical to develop due to low volumes and transportation costs.

If minerals are located prior to wilderness designation, it is estimated that up to 50 acres could be disturbed due to exploration and development of the locatable mineral resources, primarily uranium. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case the potential for recovery of the locatable minerals noted above would be foregone. After that date, all other lands (including claims not determined valid) would be closed to prospecting and development (USDl, BLM, 1981).

Because production of these minerals is not currently occurring and economic considerations are unfavorable, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Therefore, this alternative would probably not result in any significant short-term loss of recoverable locatable mineral resources, but in the

DEVILS CANYON WSA

sites; it is estimated that following designation primitive recreation use could be as much as 480 visitor days per year (USDI, BLM, 1985). This is 430 visitor days (860 percent) over the area's current estimated 50 annual primitive visitor days.

The 900 visitors days of ORV play activity and/or vehicular camping and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the San Rafael region.

Overall, wilderness designation would result in a decline in total recreation use in the WSA. The projected 1,345 visitor days per year lost to ORV use would only be partially offset by the predicted 430 visitor day increase in primitive recreation use resulting from wilderness designation.

WILDERNESS VALUES

Designation and management of all 9,610 acres as wilderness would ensure the preservation of the wilderness values of size, naturalness (8,950 acres), and outstanding opportunities for solitude (7,050 acres) and primitive and unconfined recreation (3,200 acres). The special features in the WSA (i.e., scenic and geologic resources and wild horses) also would be protected and preserved.

The 9,610 acres would be closed to ORVs. However, a heavy concentration of ORV use and vehicular traffic occurs in the Justensen Flats area and the head of Devils Canyon drainage for about 2 miles, and it would be difficult to prevent continuation of this use. Some ORV tracks exist within the WSA near Sagebrush Bench and Kimball Draw. Tracks in these two areas and within the Devils Canyon drainage would reclaim over time, if use could be restricted. Established trails and camps on Justensen Flats are significant imprints and may never reclaim to a point of being unnoticeable. Some vehicle use associated with grazing practices or valid existing rights for mineral uses could continue.

Wilderness values would benefit from the prevention of an estimated 206 acres of surface-disturbing activities, since potential disturbance anticipated is 50 acres as compared to 256 acres with the No Action Alternative.

Outstanding opportunities for solitude and limited opportunities for primitive and unconfined recreation, where present, would be preserved. About 7,050 acres within the WSA meet the criteria for outstanding opportunities for solitude and 2,560 acres do not meet the criteria. Primitive types of recreational activities are limited to

hiking, backpacking, and scenic observations. Only about 3,200 of the 9,610 acres meet the criteria set for these types of use. These opportunities could be more attractive with wilderness designation as ORV use would be eliminated. In Devils Canyon, where use would likely concentrate, solitude opportunities may be less than outstanding.

The special features (scenic and geologic resources and the wild horse herd) would be protected within 9,610 acres, except for the up to 50 acres disturbed by mining claim activities.

Thus, it is concluded that designation and management of all 9,610 acres of the Devils Canyon WSA as wilderness would protect and preserve the wilderness values of naturalness (8,950 acres), special features, and outstanding opportunities for solitude (7,050 acres) and primitive and unconfined recreation (9,610 acres), except in areas where ORV use could be difficult to manage, increased primitive use could cause congestion within Devils Canyon, and surface disturbance resulting from mineral exploration could occur on up to 50 acres.

LAND USE PLANS AND CONTROLS

Wilderness designation would not conflict with the *Emery County Zoning Plan* because this use would continue; however, closure to mineral leasing and mining claim location would not be consistent with the county plan. The BLM San Rafael MFP does not provide for wilderness designation. A decision by Congress to designate the WSA as wilderness would be an amendment to the MFP. Plans of other agencies would not be affected.

SOCIOECONOMICS

Overall there would be no significant changes in current trends of population, employment, and local income distribution.

The potential for mineral development in the WSA is low to moderate (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for uranium development is moderate, it is estimated that potential mineral-related local income could be reduced by wilderness designation, not

DEVILS CANYON WSA

long term loss of uranium recovery could be important.

WILDLIFE

Wildlife would benefit from prevention of up to 206 acres of surface-disturbing activities (only 50 acres of potential disturbance still would occur). There are no critical wildlife habitats or threatened and endangered animal species within the WSA. There are no proposed wildlife management facilities or vegetation treatment projects.

Increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife populations. Mining claim development projected for 50 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA.

LIVESTOCK AND WILD HORSES

Present domestic livestock grazing would continue as authorized in the San Rafael Resource Area MFP. The 301 AUMs currently allocated in the Devils Canyon WSA would remain available for cattle forage. Since very little use of motorized vehicles is currently taking place to manage livestock within the WSA, little effect on livestock grazing is expected.

Rangeland improvements (one 0.25-mile gap fence and one stock reservoir) would be maintained, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources if wilderness protection criteria are met. However, none are now proposed.

The wild horses within the WSA would continue to use the WSA and would benefit from this alternative since only 50 acres of habitat would be disturbed compared with 256 acres with the No Action Alternative.

VISUAL RESOURCES

The visual resources of the WSA would change from VRM Class II to the more restrictive Class I, which generally allows only natural ecological changes. This would reduce the potential for surface-disturbing activities. Under this alternative, surface disturbance would be 50 acres associated with development of valid mining claims, as compared to 256 acres projected for the No Action Alternative. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual

quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. Because the potential disturbance would be only 50 acres and the potential for development of mining claims in the foreseeable future is low, visual quality would probably not be reduced in the WSA as a whole.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to the increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activity, and the overall impact would be positive.

RECREATION

The entire 9,610 acres of the Devils Canyon WSA would be closed to recreational ORV use. Approximately 900 visitor days of traditional ORV use occurring in Justensen Flats, Sagebrush Bench, and Kimball Draw areas (1,680 acres) would be foregone.

Mineral-related surface disturbance on up to 50 acres could cause localized impairment to the quality of recreational values in parts of the WSA.

Except on the 50 acres disturbed, primitive recreation type values would be enhanced through specific management. This alternative could also benefit primitive recreation opportunities by reducing the likelihood of surface-disturbing activities from mineral exploration and development by eliminating ORV impacts and by increasing management attention and public recognition of these specific primitive recreational values. However, compared to other selected WSAs in the region, primitive recreation opportunities are limited in the Devils Canyon WSA. No opportunities for commercial outfitters would exist.

As discussed for the No Action Alternative, recreational use is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an increase in primitive recreational use above the baseline rate. Judging from use densities of a number of primitive areas, wilderness, and proposed wilderness areas in the region; the WSA's site characteristics; the population distribution about the WSA; and the availability of similar

DEVILS CANYON WSA

significantly in the short term but more likely in the long term. Uranium/vanadium likely are the minerals with the most potential to increase revenues to the local economy in the long term; however, current market factors would prevent any income from these minerals in the foreseeable future.

Livestock use and ranchers' income would continue as at present with \$6,020 of livestock sales and \$1,505 of ranchers' return to labor and investment. Future improvements for livestock would be foregone along with any resulting increase in ranchers' income. However, this would have no projected economic effect since no such potential range improvements have been proposed.

Increased public awareness of the area resulting from designation could increase primitive recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would not be significant.

Motorized recreational use of the WSA is light (900 visitor days per year) and the decrease in ORV-related local expenditures would be about \$3,690. The net loss of projected recreation income would be \$3,752 for the All Wilderness Alternative as compared to the No Action Alternative. This would be insignificant to both the local economy and individual businesses.

Not reissuing existing leases on 6,250 acres would cause an eventual loss of up to \$18,750 per year of oil and gas lease fees to the Federal Treasury. There would also be a potential future loss of \$10,080 annually in Federal revenues from the 3,360 acres that could be leased for oil and gas with the No Action Alternative. In addition to these rental fees, any potential royalties from new lease production could also be foregone. Although prospects for development are thought to be low, any revenues potentially associated with other leasable minerals, such as potash, could be foregone.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.

DEVILS CANYON WSA

- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U. S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (Map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Sids Mountain WSA



SIDS MOUNTAIN WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative	4
Partial Wilderness Alternative (Proposed Action)	7
Summary of Environmental Consequences	10
AFFECTED ENVIRONMENT	10
Air Quality	10
Geology	10
Soils	10
Vegetation	13
Water Resources	14
Mineral and Energy Resources	14
Wildlife	18
Forest Resources	18
Livestock and Wild Horses/Burros	19
Visual Resources	19
Cultural Resources	20
Recreation	20
Wilderness Values	21
Land Use Plans and Controls	23
Socioeconomics	23
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	25
Analysis Assumptions and Guidelines for All Alternatives	25
No Action Alternative	25
All Wilderness Alternative	30
Partial Wilderness Alternative (Proposed Action)	33
ADDENDUM	34
BIBLIOGRAPHY	37

SIDS MOUNTAIN WSA

(UT-060-023)

INTRODUCTION

General Description of the Area

Sids Mountain Wilderness Study Area (WSA) is in the San Rafael Swell region of Emery County, Utah. The WSA contains approximately 80,530 acres of BLM-administered lands, including Sids Mountain, a portion of the San Rafael River, numerous canyons and drainages, arches, spires, and benches of the northwestern part of the San Rafael Swell. The WSA is roughly 8 miles wide (east to west) and 22 miles long (north to south).

The Sids Cabin WSA UT-060-023A, which contains 440 acres, is located entirely within the Sids Mountain WSA. Refer to Addendum 1 of this individual analysis for additional information about the Sids Cabin WSA.

The WSA is situated north of Interstate 70 (I-70), west of the San Rafael Campground and southwest of Buckhorn Canyon. The nearest towns are Castle Dale (16 miles), Huntington (20 miles), and Ferron (12 miles).

The topography of the WSA can be divided into four categories: colorful badlands and mesas, deep canyon drainages, parklands, and unusual rock formations.

The rolling badlands are a colorful mix of soils, cliffs, and mesas. This type of topography is found in the western portion of the WSA. Elevations here range from 6,000 to 6,800 feet. As the topography rises in elevation, mesas become more prominent and colors are less varied.

The majority of the WSA is cut by an intricate canyon system. The predominant canyons of this system are Bullock Draw, McCarty Canyon, Coal Wash, Salt Wash, Saddle Horse Canyon, Eagle Canyon, Cane Wash, Virgin Springs Canyon, and the Little Grand Canyon. Each of these drainages is characterized by massive sandstone walls, fingered tributary canyons, and long winding and twisting routes. Water has been the major erosive agent of these drainages. Elevations range from 5,100 feet in the canyon bottoms to 6,800 feet atop the canyon walls.

Perched above and between these canyons are flat to rolling parklands. Vegetation cover is dominated by grasses, and boundaries are established by sandstone rock formations. Elevations in these areas range from 6,000 to 6,400 feet. Secret Mesa, Cactus Flats, No Mans Mountain, and Sids Mountain best depict these parklands.

Spotted throughout the WSA are interesting and unusual rock formations. Many of these features have been named by their historic finders, such as Joe and His Dog, Devils Monument, Devils Race-track, Bottle Neck Peak, The Blocks, and Chimney Rock. Several large arch formations also are scattered throughout the area.

The area is warm and arid to semiarid. Temperatures range from 5 to 100 degrees Fahrenheit (F). Average annual precipitation is 8 to 12 inches, most of which occurs in the form of rain. About 15 inches of snow fall between October and April.

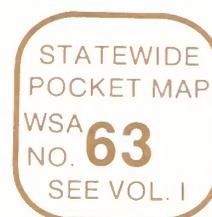
The Sids Mountain WSA comprises the northwest portion of the San Rafael Swell, while immediately to the east the Mexican Mountain WSA includes the northeast part of the San Rafael Swell. The Devils Canyon WSA is adjacent to the south of the Sids Mountain WSA, separated by I-70.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the San Rafael area are discussed in Volume I. Five specific issues pertaining to the Sids Mountain WSA were identified through formal public scoping (USDI, BLM, 1984b) and are responded to below:

1. *Comment:* The occurrence of the sensitive plant species *Pediocactus despainii*, *Hymenoxys depressa*, *Cryptantha jonesiana*, and *Lomantium junceum* in or near this WSA should be considered in the decisionmaking process.

Response: *Cryptantha jonesiana* and *Lomantium junceum* have been dropped from study by the Fish and Wildlife Service (FWS). A discussion on six candidate or proposed and two listed endangered plant species that may occur in the WSA can be found in the Affected Environment section of this document. The effects of designation or nondesignation on these species are discussed in the Environmental Consequences of Alternatives section. Because of existing law, regulation, and BLM policy, sensitive plant species would generally be protected from disturbance and loss



2. *Comment:* The boundary along the western edge of the WSA appears to be appropriate. However, the WSA boundary should be modified to exclude the Moore Road corridor and the adjacent area, which were previously disturbed by road building and off-road vehicle (ORV) use. The boundary should begin at the cliff edge within Section 33.

Response: The boundary along the western edge of the WSA is coincident with the Moore Road corridor, where a maintenance-and-use border would be allowed along roads that are adjacent to or "cherry-stemmed" into the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trail-head parking. This border would be up to 100 feet from the edge of the road travel surface. The ORV travel in this particular area is basically related to temporary vehicle pull-off. The previously disturbed area is related to mining claim assessment work. It is expected that the disturbed area would be rehabilitated if the WSA were designated as wilderness.

3. *Comment:* Does the area have uranium potential?

Response: Science Applications, Inc. (SAI, 1982) has estimated the WSA to have the potential for 500 to 1,000 tons of uranium oxide, which is considered moderately favorable for occurrence.

4. *Comment:* Conflicting uses (ORVs) should not be a factor in dropping all or part of the WSA.

Response: Traditional ORV use in parts of the WSA would be difficult to eliminate due to the nature and character of terrain in the affected areas (wide wash bottoms with many existing access routes into the area). BLM considers portions of the WSA unmanageable as wilderness because of this problem.

5. *Comment:* The oil and gas potential of the WSA is ranked low by SAI (1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be low to moderate. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation

reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, suggestions were received requesting minor boundary adjustments that would eliminate resource conflicts in the Moore Road area. After review, it was found that boundary adjustments had been made that eliminated most of these conflicts. No additional alternatives were necessary.

Alternatives Analyzed

Three alternatives are analyzed for the Sids Mountain WSA: (1) No Action; (2) All Wilderness (80,530 acres); and (3) Partial Wilderness (78,408 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections for each alternative. These assumptions are indicated in each case.

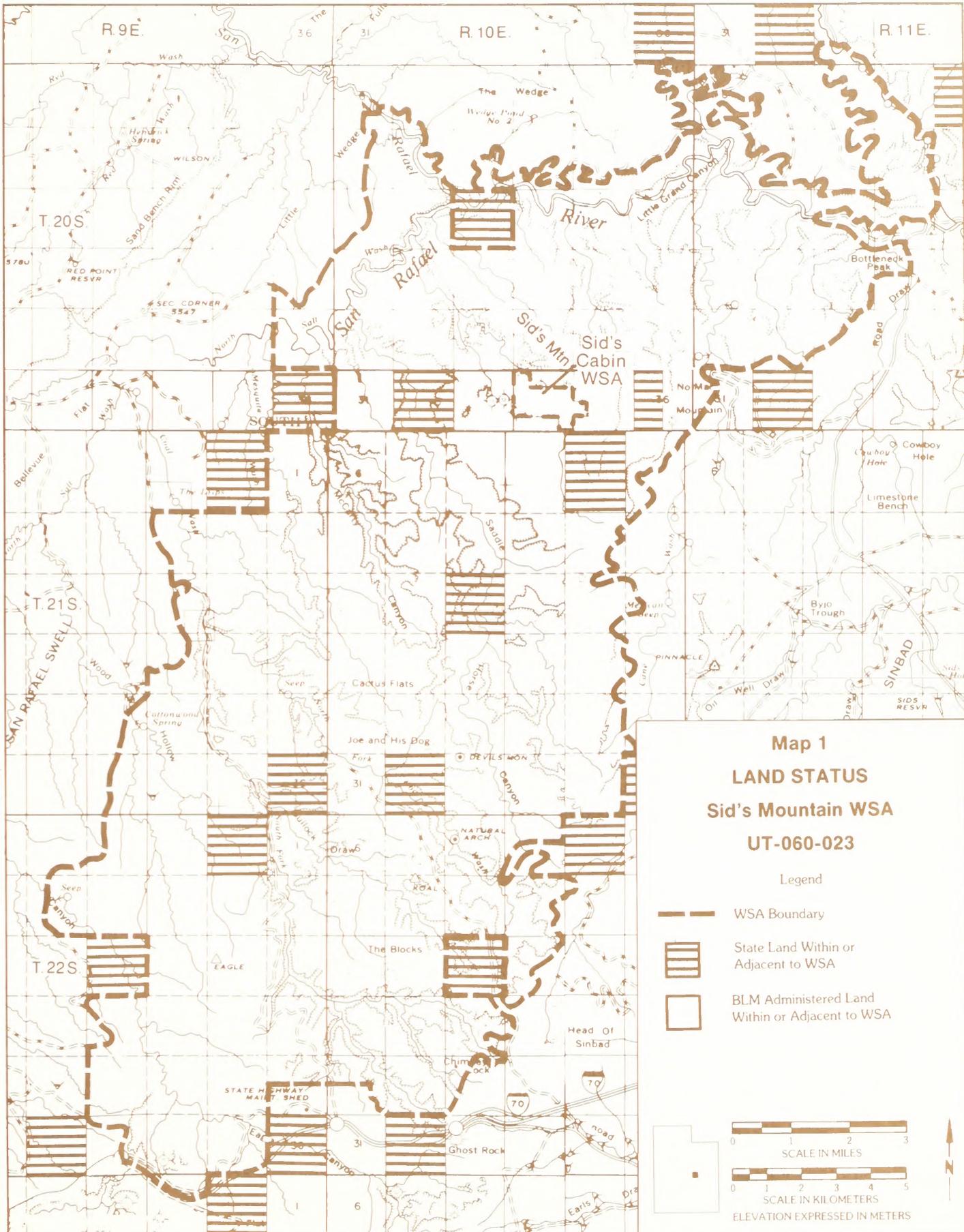
NO ACTION ALTERNATIVE

With this alternative, none of the 80,530-acre Sids Mountain WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the San Rafael Resource Area Management Framework Plan (MFP) (USDI, BLM, 1979a). The 4,391.32 acres of State land and 440 acres of split estate land (private surface and Federal minerals) within the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase (although recently a BLM exchange for the split estate land has been suggested by the landowner). Refer to Volume I for further information on State in-holdings.

The following are specific actions that would take place with this alternative:

- The WSA would remain open to mineral location with the exception of about 860 acres that are withdrawn from location of claims for nonmetalliferous minerals. Development work, extraction, and patenting would be allowed on 803 existing mining claims (10,500 acres) and future mining claims. Development would be regulated

SIDS MOUNTAIN WSA



Map 1
LAND STATUS
Sid's Mountain WSA
UT-060-023

Legend

-  WSA Boundary
-  State Land Within or Adjacent to WSA
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS



SIDS MOUNTAIN WSA

by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809), without concern for wilderness values. Existing oil and gas leases (14,160 acres) and future leases could be developed under leasing Category 1 (standard stipulations) on 5,760 acres and Category 3 (no surface occupancy) on 18,560 acres. The remaining acreage in the WSA (56,210 acres) would continue to be managed as Category 4 (no leasing). The San Rafael Swell Special Tar Sand Area (STSA) has about 2,500 acres in the WSA. With the No Action Alternative, competitive combined hydrocarbon leasing could occur on all 2,500 acres, as provided for in the MFP amendment documented in the *Utah Combined Hydrocarbon Leasing Regional Final EIS* (USDI, BLM, 1984a) and the related *Record of Decision* (USDI, BLM, 1984c).

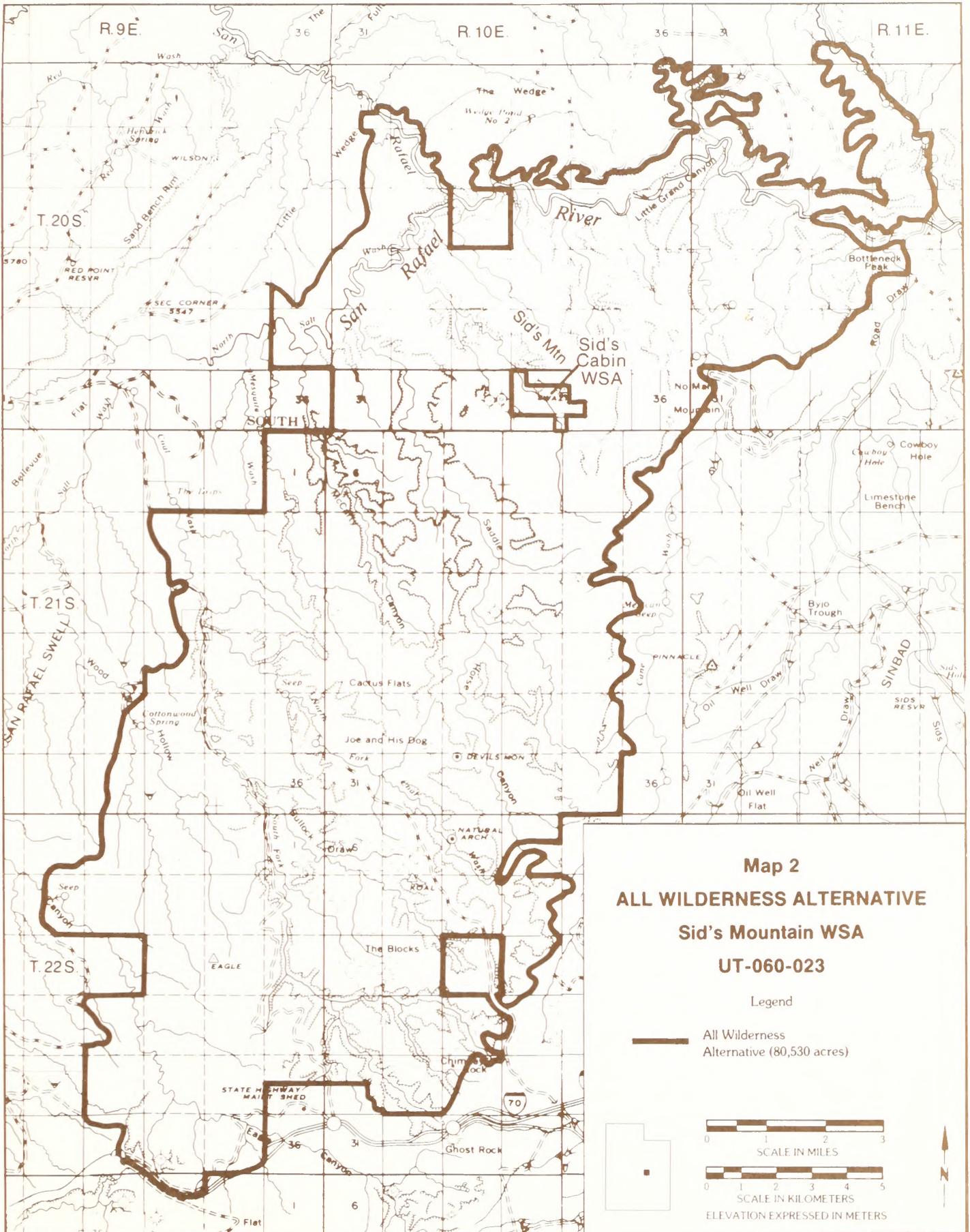
- The present domestic livestock grazing use in the WSA would continue as authorized in the MFP (currently 2,374 Animal Unit Months [AUMs]). Existing developments (including two reservoirs, one fence, one tank, one trough and pipeline, one trail, and access routes) could be used and maintained. New range developments would be allowed without wilderness considerations; however, there are no current plans for additional range improvements. No wild horses or burros are found in the WSA.
- Developments for wildlife, water resources, etc. could be allowed if in conformance with the MFP. Reintroduction of native species for the purpose of augmenting present populations could be considered. No other wildlife projects are currently proposed.
- Approximately 79,010 acres would remain closed to ORV use except as future changes may be made in BLM land use plans. About 27 miles (1,520 acres) of primarily trails and wash bottoms would remain open to ORV use.
- The entire WSA would remain closed to woodland product harvest as discussed in the MFP. There is no harvest of forest products at the present time, nor is any planned.
- The WSA would continue to be managed under Visual Resource Management (VRM) Class II (80,530 acres).

- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.
- Variations of the No Action Alternative would be to evaluate the entire Sids Mountain WSA for special management. Possible designations include an Outstanding Natural Area (ONA), an Area of Critical Environmental Concern (ACEC), or a Special Recreation Management Area (SRMA). Values that would be considered in making one of these designations include recreation, visual, ecologic, scenic, historic, and cultural resources. Management objectives (including the size of the special designation area) could be developed through the BLM planning process and subsequent activity management plan. Designation could result in ORV closure, mineral entry withdrawal, and other management actions similar to those identified for wilderness management. BLM special management designation would be a separate action that would be subsequent to any Congressional action on the wilderness review. Since the variations could be considered in future routine BLM planning, they are not addressed further in this EIS.

ALL WILDERNESS ALTERNATIVE

With this alternative, all 80,530 acres of the Sids Mountain WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). The WSA would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, acquisition of 4,391.32 acres in seven sections within the WSA and four sections (2,560 acres) adjacent to the WSA as requested by the State (refer to Map 1) would be likely, and could be authorized by purchase or exchange.

SIDS MOUNTAIN WSA



SIDS MOUNTAIN WSA

Thirteen other State sections adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. (Refer to Volume I for further information on State in-holdings.) The figures and acreages given under this alternative are for Federal lands only. About 440 acres of split estate (private surface) land located in the WSA would not be acquired unless requested by the landowner or unless conditions as described in the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964) occurred in the future.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 80,530 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on the approximately 10,500 acres of the 803 existing mining claims if determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases involving about 14,160 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown prior to wilderness designation. Competitive combined hydrocarbon leasing on 2,500 acres of the San Rafael Swell STSA located in the WSA would not be allowed.
- Present domestic livestock grazing would continue as authorized in the San Rafael MFP. The 2,374 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland improvements (including one fence, two reservoirs, one tank, one trough and pipeline, and trail) that are existing at the time of designation would continue in the same manner as in the past based on practical necessity and reasonableness. It is assumed that after designation new rangeland improvements (none are now planned) would be allowed if necessary for the protection or effective management of the rangeland and/or wilderness resource, if they can be carried out consistent with wilderness protection standards (refer to Appendix 1).
- New water resource facilities or watershed activities (not related to rangeland or wild-

life management) would be allowed after designation only if compatible with wilderness values, needed to correct an imminent hazard to life or property, or authorized by the President pursuant to Section 4(d)(4) (1) of the *Wilderness Act*. No wildlife water resource facilities or watershed treatments are located in the Sids Mountain WSA, and none currently are planned.

- Wildlife transplants or developments would be allowed after designation if compatible with wilderness values.
- The entire 80,530-acre area would be closed to ORV use except for (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved rangeland developments. About 27 miles of existing vehicular ways within the WSA would not be available for vehicular use except as indicated above. The approximately 21 miles of roads that border the WSA would remain open to vehicular use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 80,530-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to or "cherry-stemmed" into the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. It is assumed that firefighting would be limited to hand and aerial methods.

SIDS MOUNTAIN WSA

- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals, while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

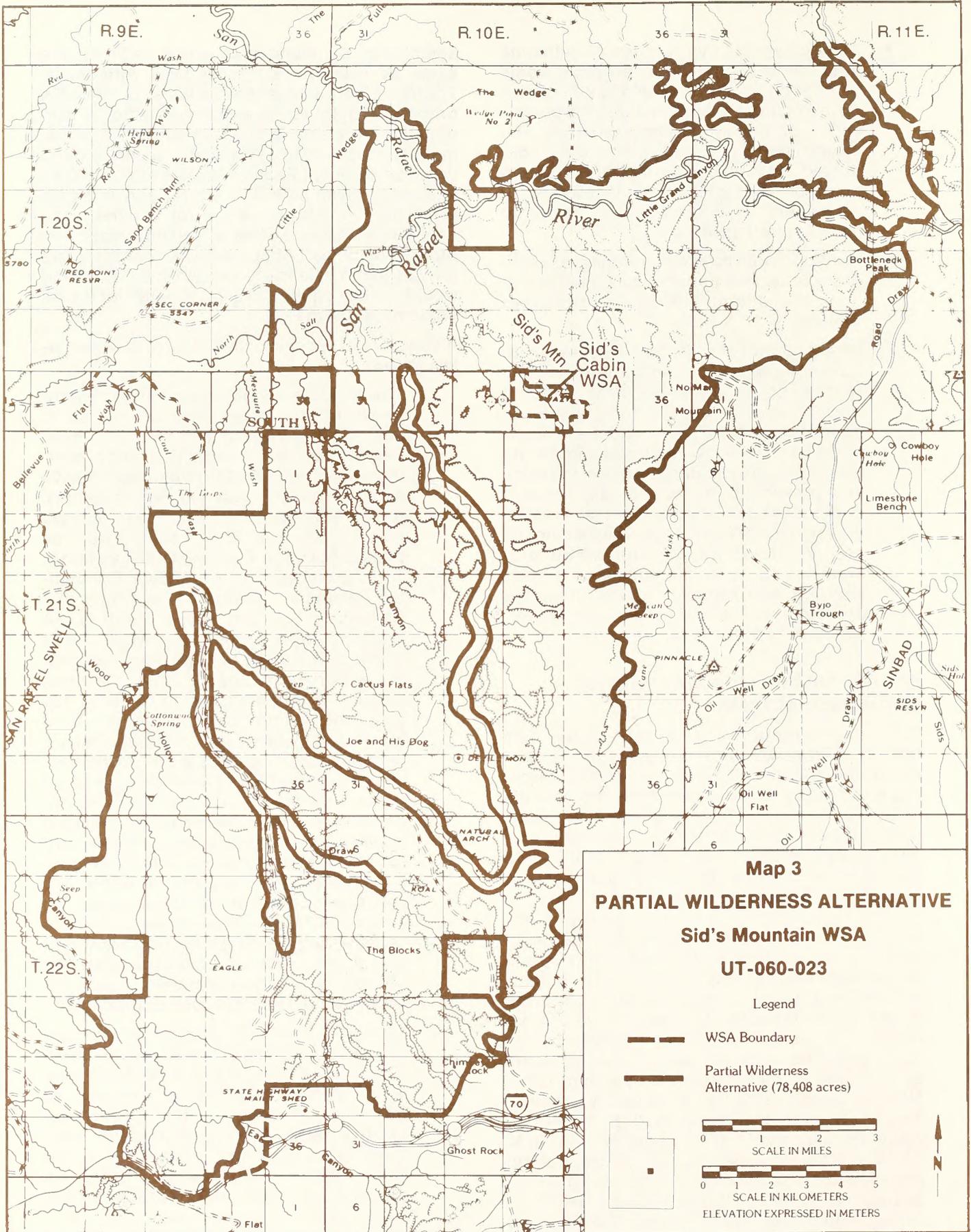
With this alternative, 78,408 acres of the Sids Mountain WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics and to avoid conflicts with traditional ORV access routes (e.g., access routes into Saddle Horse Canyon, North and South Forks of Coal Wash, Bullock Draw, and Eagle Canyon). The maintenance of ORV routes would divide the wilderness area into two distinct sections on each side of North Fork Coal Wash. Each section would have about 9 miles of ORV access corridors (ways and wash bottoms) "cherry-stemmed" into the area. A small area subject to vehicle sounds from nearby I-70 also would not be included in this alternative. The nondesignated 2,122 acres would be managed in accordance with the San Rafael MFP, as described for the No Action Alternative. The 78,408-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy," as described in the All Wilderness Alternative. Upon designation, acquisition of seven State sections (4,071.32 acres) within and four sections (2,560 acres)

adjacent to the wilderness would be likely, the same as with the All Wilderness Alternative. Thirteen other State sections adjacent to the WSA probably would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given for this alternative are for Federal lands only. (Refer to Volume I for further information on State in-holdings.) About 440 acres of split estate (private surface) land are located in the WSA and would not be acquired except as noted for the All Wilderness Alternative.

A summary of specific actions under this alternative follows.

- The 78,408-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. However, development work, extraction, and patenting would be allowed to continue on 10,500 acres of the 803 existing mining claims, provided they are valid. Existing oil and gas leases that cover 13,840 acres would be phased out upon expiration unless a find in commercial quantities is shown. Competitive combined hydrocarbon leasing in that portion of the San Rafael Swell STSA located in the wilderness area would not be allowed. The 2,122-acre area not designated wilderness would be open to mineral location with the exception of about 100 acres that would remain withdrawn from location of claims for nonmetalliferous minerals. Development work, extraction, and patenting of future mining claims could occur if the claims are valid. The area not designated wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on about 200 acres, Category 3 (no surface occupancy) on about 475 acres, and Category 4 (no leasing) on about 1,447 acres. Development of future oil and gas leases could occur without concern for wilderness values although the linear configuration of most of the 2,122 acres would constrain such development.
- Domestic livestock grazing would continue as authorized in the San Rafael MFP. The 2,334 AUMs in the wilderness area would remain available to livestock as presently allotted. In the wilderness, existing range developments could continue to be used and maintained in the same manner as in the past based on practical necessity and reasonableness.

SIDS MOUNTAIN WSA



SIDS MOUNTAIN WSA

New rangeland developments would be allowed after designation only if necessary for the protection and effective management of the rangeland and/or wilderness resources, if wilderness protection criteria are met. In the 2,122-acre nonwilderness area, grazing use of 40 AUMs would continue as authorized in the MFP, and vehicle access would be allowed in conjunction with livestock management.

- In the 78,408-acre wilderness new water resource facilities or watershed activities (other than rangeland developments) would be allowed only if compatible with wilderness, needed to correct imminent hazards to life and property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the 2,122-acre nonwilderness area, water resource developments would be allowed if in accordance with the MFP. None are now planned.
- In the wilderness area, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the nonwilderness area, wildlife transplants or improvements would be allowed if in accordance with the MFP without consideration for wilderness values.
- The 78,408-acre wilderness area would be closed to ORV use. The 2,122-acre remainder of the unit would remain open to vehicular travel. About 5 miles of existing vehicular ways within the wilderness portion would no longer be available for vehicular use except for purposes identified under the All Wilderness Alternative.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 78,408-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface, or the edge of the right-of-way for State Highway 95, whichever is greater.
- Harvest of forest products in the wilderness area would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The area not designated wilderness would also remain closed to woodland harvest based on decisions documented in the San Rafael MFP.
- Visual resources in the wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The 2,122 acres not designated as wilderness would be managed as Class II as currently set forth in the San Rafael MFP.
- Within the wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. It is assumed that firefighting would be by hand or aerial means. In the area not designated as wilderness, measures of control would be taken without wilderness considerations.
- In the nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 78,408-acre wilderness such activity would be allowed by permit if compatible with wilderness preservation. Use would be limited to that conducted without motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the 2,122-acre nonwilderness area hunting utilizing vehicle access would be allowed subject to applicable State and Federal laws and regulations. In the 78,408-acre wilderness, use would be allowed subject to applicable laws and regulations but would be limited to nonmotorized means.
- In the nonwilderness area, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the wilderness area, control of predators would be allowed for the same purposes, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental impacts that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the San Rafael MFP (USDI, BLM, 1979a), other BLM file material, and knowledge of resource specialists.

Air Quality

The WSA is in a Prevention of Significant Deterioration (PSD) Class II attainment area and currently meets Class II standards of air quality classification (1977 Clean Air Act, as amended). The nearest Class I area is Capitol Reef National Park, located approximately 45 miles southwest of the WSA.

Potential pollution sources include industrial and vehicular emissions originating from the Castle Valley and Green River areas. A large point source includes powerplants located 8 miles west of the WSA in Castle Valley. Fugitive dust is an intermittent, localized concern as a result of construction, traffic on dirt roads, and wind patterns. Visibility from promontories within the WSA is good, ranging from 30 to 100 miles, although hazy conditions occasionally affect views to the north and west.

Geology

The Sids Mountain WSA is located in the northern portion of the San Rafael Swell. During the Eocene period, the area began to be uplifted, creating a bulge in the existing formations. A period of nondeposition and erosion began carving and shaping the area with deep-cut drainages and rugged terrain. The San Rafael Swell, a breached, doubly plunging anticline, is a prominent north-trending uplift on the Colorado Plateau. Elevations in the Sids Mountain WSA range from 5,100 to 6,800 feet.

The WSA is located in the Canyonlands Section of the Colorado Plateau Physiographic Province. Geologic formations outcropping in the WSA range from the Triassic Moenkopi Formation on

the east to the Jurassic Carmel Formation on the west. The formations dip to the northwest at less than 10 degrees.

The Moenkopi Formation, found along the eastern border of the WSA, consists of red and buff, cross-bedded, medium-grained sandstone, mudstone, green-gray and red shale, and conglomerate. Toward the base of the formation is the Sinbad Limestone Member. The Moenkopi Formation is known as an oil and gas producer.

Also along the eastern boundary and exposed within the WSA's eastern drainages is the Chinle Formation. This formation consists of sandstone, variegated shale, and conglomerate, all of which are lenticular and intertonguing. The formation is an uranium producer and is composed of four members: Temple Mountain, Monitor Butte, Mossback, and Church Rock.

The Wingate Formation lines the cliff faces of the WSA's major canyons. It consists of buff, orange and brown, massive cross-bedded, medium-grained sandstone conglomerate and lenses of cherty limestone.

The Kayenta Formation is situated above the Wingate, in the higher elevations of the WSA. It is composed of red, argillaceous sandstone, cross-bedded in part with red and green shale and a siltstone-pebble conglomerate.

Navajo Sandstone is another colorful formation found in the upper reaches of the WSA. The formation is a massive, medium-grained, cross-bedded sandstone. Tan, gray, orange, and yellow-colored caps appear as petrified dunes. Lenses of limestone up to 5 feet thick occur in the upper half of the formation. Situated within this formation are many arches, caves, pinnacles, buttes, and knobs. The Navajo Sandstone makes up the greatest percentage of the WSA.

The Carmel Formation forms the western border of the WSA. It consists of brown to gray, sandy limestone, red, thin-bedded sandstone, and red and green shale with beds of gypsum. The limestone portion forms cliffs while the remainder forms a dip slope.

Soils

The WSA contains five general soil characteristics as shown in Table 2. Wind is a minor erosive agent in the WSA, with water actions moving most soil. Overall, erosion potential generally is low. Because of sparse vegetation cover, the pattern of precipitation that comes in brief, intense summer thunderstorms can create locally severe erosion, especially on steep slopes and in

SIDS MOUNTAIN WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
SIDS MOUNTAIN WSA**

Resource	Alternatives		
	No Action	All Wilderness (80,530 Acres)	Partial Wilderness Designation (78,408 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 3 million barrels of oil from tar sand, 750,000 tons of potash, 500 to 1,000 tons of uranium oxide, 50,000 tons of copper, and 100,000 tons of manganese. Low temperature geothermal energy might also be developed.	Oil, gas, oil from tar sand, potash, and geothermal energy likely would not be recovered or developed. Assuming a worst-case analysis, uranium, copper, and manganese recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.	Effects would be substantially the same as for the All Wilderness Alternative.
Wildlife	About 0.5 percent of the WSA could be affected by energy and mineral development, which could adversely affect wildlife habitat, including yearlong crucial desert bighorn habitat.	Wildlife would benefit from solitude.	Wildlife would benefit from solitude in the designated portion. About 0.2 percent of the designated portion and 0.3 percent of the non-designated area would be affected by mineral and energy development.
Livestock	Grazing of 2,374 AUMs and maintenance of existing developments would continue. New developments could be implemented; however, none are now proposed.	Grazing of 2,374 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 370 acres.	Visual quality could be impaired on up to 170 acres.	Visual quality could be impaired on up to 6 acres in the nondesignated portion. About 97 percent of the Class A scenery would be in the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 27 miles of ways. Overall recreational use could increase from the present 500 visitor days per year to 745 over the next 20 years. Up to 370 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 27 miles of ways, would be closed to ORV use. Recreational use could increase to up to 16,106 visitor days per year over the next 20 years due to publicity associated with wilderness designation.	ORV recreational use could continue on 22 miles of ways in the undesignated portion. Overall recreational use could increase to up to 15,680 visitor days per year over the next 20 years.

SIDS MOUNTAIN WSA

**TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
SIDS MOUNTAIN WSA**

Resource	Alternatives		
	No Action	All Wilderness (80,530 Acres)	Partial Wilderness Designation (78,408 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 370 acres (0.5 percent of the WSA).	Wilderness values would be protected, except on up to 170 acres (0.2 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected in the designated area. Impairment could occur on 0.3 percent of the 2,122 acres not designated. Overall, wilderness values could be lost on up to 0.2 percent of the WSA. However, 98 percent of the area meeting the standards for naturalness, all of the area meeting the standards for outstanding opportunities for solitude, and 97 percent of the area meeting the standards for outstanding opportunities for primitive recreation would be in the designated portion and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , State of Utah plans and policies, and the current BLM San Rafael MFP.	This alternative would not be consistent with Emery County zoning. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM San Rafael MFP.	Partial Designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Emery County zoning.
Socio-economics	Annual local sales of less than \$84,330 and Federal revenues of up to \$45,804 would continue. An additional \$30,480 per year in Federal revenue could be derived from leasing of presently unleased areas.	Annual local sales of less than \$84,330 and Federal revenues of up to \$3,324 would continue, but Federal revenues of up to \$72,960 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, but increased recreational use over the next 20 years might increase local benefits by up to \$66,035.	Effects would be about the same as for the All Wilderness Alternative.

SIDS MOUNTAIN WSA

exposed wash channels. About 30 percent of the WSA has high erosion potential when soils are disturbed. The erosion estimates for the WSA are shown in Table 3.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	30	24,159	0.0	0
Shallow loamy soils on sloping structural benches	25	20,132	1.0	5
Moderately deep to deep loamy soils on sloping alluvial fans some of which are gypsum affected	5	4,027	1.0	5
Deep and very deep loamy and sandy soils on nearly level benches and drainage ways	10	8,053	0.1	1
Deep and very deep stony soils on steep alluvial fans	30	24,159	1.0	10
Totals	100	80,530		

Source: Hansen, 1985.

Vegetation

The dominant type of vegetation in the WSA is pinyon-juniper woodland. Pinyon-juniper vegetation is found on foothills and mesas and other areas of relatively high elevation and precipitation in the area. Soils in these areas are typically shallow and rocky. The pinyon-juniper type does not extend to lower elevations due to low precipitation, high temperatures, and saline substrate. Major species are pinyon pine and Utah juniper.

Desert shrub is another type of vegetation occurring in the WSA. It is in locations characterized by low precipitation, high temperatures, and rapid evaporation. It is found on gravelly benches and gently sloping sandy lowlands. Soils are mostly shallow and rocky. Major shrubs are Mormon tea, shadscale, rabbitbrush, snakeweed, blackbrush, fourwing saltbush, black sagebrush, and wild buckwheat. Other common plants are curly grass, Indian ricegrass, sand dropseed, sandy muhly, blue grama, and globemallow. The sandy soils also support some additional plants not common in other parts of the San Rafael Swell, including wavy-leaf oak, sand sagebrush, and purple sage.

Sagebrush, grassland, and riparian-type vegetation each make up only 1 percent of the WSA. Sagebrush occurs on the drier portions of the pinyon-juniper type and the wetter fringes of the saltbush type. The major species are Bigelow sagebrush, bud sagebrush, pigmy sagebrush, tarragon, and fringed sagebrush.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	
High	10.0	0	0	0	30	24,159	241,590
Medium	5.0	0	0	0	30	24,159	120,795
Low	1.0	60	48,318	48,318	10	8,053	8,053
Very Low	0.1	10	8,053	805	0	0	0
None	0.0	30	24,159	0	30	24,159	0
Totals		100	80,530	149,123	100	80,530	1370,438

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.6 under present conditions; 4.6 if disturbed.

Grassland vegetation type occurs in a few scattered, isolated areas. This type is similar to the sagebrush, saltbush, and desert shrub vegetation types but is distinguished by a predominance of grasses over shrubs. The major grasses are curly grass, blue grama, Indian ricegrass, and sand dropseed.

An area classified as riparian vegetation type is located along the San Rafael River. The river is a perennial water source for these streamside plant communities. Major plants in this type are tamarisk, cottonwood, black greasewood, rabbitbrush, snakeweed, and alkali sacaton.

Table 4 shows existing vegetation types for the WSA.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper	72,598	90
Desert shrub	6,864	8
Sagebrush-grassland	588	1
Riparian	480	1
Total	80,530	100

Source: USDI, BLM, 1979a.

The Sids Mountain WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types in the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	36,239	45
Galleta-threeawn shrub steppe	28,185	35
Saltbush-greasewood	16,106	20
Total	80,530	100

Source: USDI, Geological Survey 1978.

Two listed endangered plants, *Sclerocactus wrightiae* and *Erigeron maguirei* var. *maguirei*, could occur in the WSA. In addition, six candidate or proposed plant species could potentially be found in the WSA. These include *Cycladenia humilis* var. *jonesii* (proposed endangered) and five candidate species (*Hymenoxys depressa*, *Pediocactus despainii*, *Psoralea polydenius* var. *jonesii*, *Schoenocrambe barnebyi*, and *Sphaeralcea psoraloides*).

Water Resources

The major perennial water resources are about 18 miles of the San Rafael River and about 6 miles of the lower North Salt Wash. Portions of North Fork Coal Wash, Saddle Horse Canyon, Virgin Springs Canyon, and Cane Wash flow on an intermittent basis from springs and seeps. Many of these springs and seeps flow year-round, but the water eventually pools up and evaporates or returns to the streambed alluvium. Buckhorn Draw also contains springs on or near the northern border of the WSA. These springs flow year-round.

Water use in the WSA is primarily by wildlife and livestock. Most sources are remotely located and not easily accessible by man. The only developed water sources within the WSA are Cottonwood Spring, Wood Hollow Reservoir, and Eagle Canyon Reservoir. All of these are located near the southwestern edge of the WSA.

Stream water quality is believed suitable for wildlife and domestic livestock. An odd taste of the water is a major concern for human use, especially during the irrigation season when return flows from upstream constitute a major portion of the total volume in the river. Agricultural chemicals also may be present and salinity is high. Coliform bacteria levels may become high enough during the irrigation season to present a human health hazard.

Water quality data on the remote springs are lacking. Based on geologic information, the water quality of the springs generally is assumed to be good.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy, had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for an explanation of the SAI rating system.

An overall importance rating (OIR) of 2+ was assigned to the Sids Mountain WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where

4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR is influenced primarily by the low favorability for most minerals listed in Table 6 and the moderate potential for uranium and vanadium. Exploration has already occurred in the area and, based on current exploration models, the most favorable areas probably already have been located.

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil, less than 60 billion cubic feet of gas
Tar Sand	f2	c4	Less than 10 million barrels of oil in-place
Coal	f1	c4	None
Geothermal	f2	c1	Low temperature
Hydropower	f1	c4	None
Uranium/ Vanadium	f3	c4	500-1,000 tons of uranium oxide
Copper	f2	c2	Less than 50,000 tons
Manganese	f2	c1	Less than 100,000 tons of 40-percent manganese ore
Potash	f2	c2	Less than 1 million tons

Source: SAI, 1982³.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³SAI did not rate gypsum; however, BLM has added text information.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines

strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA contains deposits of vanadium (associated with uranium), and could contain copper and manganese that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1984). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

LEASABLE MINERALS

There are no existing mineral leases in the WSA other than oil and gas. Other leasable minerals produced regionally are potash and coal. Tar sand could become a production interest and could be leased in a combined hydrocarbon lease that would also include oil and gas.

Oil and Gas

The low rating for oil and gas indicates that a potential exists within the WSA for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. An estimated 3 million barrels of oil or less than 18 billion cubic feet of natural gas are considered recoverable.

The San Rafael Swell is a structural trap. The interior of the San Rafael Swell has been eroded away, allowing any petroleum contained in the structure to escape. The Swell could only serve as a trap for formations below the Hermosa Formation, the lowest formation stratigraphically exposed in the Swell.

Although no oil and gas wells have been drilled in the WSA, one was drilled approximately 1 mile northwest of the WSA. The well was plugged and abandoned in 1975. Thus far, all oil and gas fields discovered in Emery County and the San Rafael Swell have been small. It is believed, therefore, that any oil and gas occurrences that may occur within the WSA also would probably be small.

There are currently 29 existing oil and gas leases covering approximately 17 percent (14,160 acres) of the WSA. Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

SIDS MOUNTAIN WSA

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Pre-FLPMA oil and gas leases cover approximately 6 percent (4,840 acres) of the WSA. These leases were issued without any stipulations prohibiting impairment of wilderness character. About 12 percent (9,320 acres) of the WSA has post-FLPMA leases. About 10,160 acres are unleased and would be available for future leasing. The majority of the WSA (70 percent) is closed to leasing.

The WSA was included in the Price District Oil and Gas Environmental Assessment Report (USDI, BLM, 1975). As a result, oil and gas leasing categories were established. Leasing categories within the WSA are shown in Table 7.

There are no other existing mineral leases in the WSA.

TABLE 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	5,760	7
2. Open with special stipulations	0	0
3. Open with no surface occupancy	18,560	23
4. Suspended or no lease	56,210	70
Total	80,530	100

Source: USDI, BLM, 1975.

Tar Sand

A small tar sand occurrence has been reported in the eastern and northeastern part of the WSA, occurring within the Torrey Member of the Moenkopi Formation (SAI, 1982).

Tar sand is formed when a trap containing oil is broken and the lighter fluids escape, leaving

behind the heavy fraction, or tar substance. About 2,500 acres (3 percent of the WSA) are within the San Rafael Swell STSA. Within the entire STSA, the San Rafael Swell tar sand deposits are estimated to contain 445 to 545 million barrels of oil in-place. Small portions of the Red Canyon deposit (60 to 80 million barrels of oil in-place) and the Wickiup deposit (60 to 75 million barrels of oil in-place) are part of the San Rafael Swell deposits and are located within the Sids Mountain WSA. The SAI rating for tar sand indicates a potential for small deposits (less than 10 million total barrels of oil in-place) occurring in the WSA. The high certainty level recognizes tar sand deposits in the WSA. It is unlikely, however, that the tar sand within the WSA will be developed due to individually small-sized deposits and economic factors. If tar sand development were to occur, production would probably be by in-situ methods with a recovery rate of about 30 to 40 percent of the in-place deposits (USDI, BLM, 1984a).

Coal

The WSA is considered geologically unfavorable for coal. Cretaceous coal-bearing strata either never were deposited or have been eroded away. The SAI rating for coal indicates there is no deposit. The certainty level indicates positive data supporting the rating.

Potash

Potash occurs within an evaporite sequence of the Paradox Formation in the Hermosa Group. The formation is several thousands of feet thick near Moab where potash is produced commercially. The formation thins considerably to the west and, at the San Rafael Swell, the formation has a thickness of 500 feet or less.

The SAI rating indicates that, if potash deposits occur in the WSA, they generally would contain less than 1,000,000 tons of potash. The certainty level implies that no direct data occur within or very near the WSA, although the WSA is within a recognized evaporite basin. The potash-bearing rocks are expected to be low grade, thin, and discontinuous. Along with small tonnage expectancy, these factors combined make it unlikely that the potash resource in the WSA would be developed.

Geothermal

Based on the regional distribution of thermal springs and wells in the vicinity of the San Rafael Swell and on the area's geologic history, the only geothermal potential associated with the WSA is low-temperature thermal waters (between 20 degrees Centigrade [C] and 90 degrees C). Water extracted at these temperatures can only be used

SIDS MOUNTAIN WSA

for direct heating purposes. It seems very unlikely that this resource, even assuming it exists, would ever become economical to use considering the probable great depth to the resource, the associated high drilling costs, and a lack of a nearby population that could use the resource. Therefore, the Sids Mountain WSA has been rated as having a low potential for use of this resource.

LOCATABLE MINERALS

There are 803 mining claims located within and adjacent to the WSA. They cover approximately 10,500 acres, totaling about 13 percent of the WSA. None of these claims have been patented and only 266 appear current in their assessment. Mining claims along the western edge of the WSA are probably for gypsum and the remainder are probably for uranium/vanadium. About 860 acres of the WSA are withdrawn from location of non-metalliferous minerals. With the exception of gypsum, the locatable minerals in the WSA are metalliferous and would not be affected.

Uranium/Vanadium and Associated Minerals

The uranium/vanadium deposits that occur within the San Rafael Swell are generally small (500 to 1,000 tons of uranium oxide) and scattered. The deposits occur in the Chinle Formation, which is comprised of the Temple Mountain, Monitor Butte, Mossback, and Church Rock Members. Uranium/vanadium ore is found primarily in the Mossback Member in channel sands and as lenticular deposits in the Monitor Butte Member (SAI, 1982). The uranium/vanadium was deposited when ore-bearing solutions encountered a reducing environment. The solution probably moved laterally through mudstone and encountered a reducing solution in the sandstone where the ore was then deposited. Other minerals associated with uranium/vanadium include copper, lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver. None of these minerals occur in sufficient grades or quantities within the WSA to be minable. These metals indicate a hypothermal solution was their source, although the uranium/vanadium could have been leached from volcanic clays.

The northern part of the WSA is within the northern uranium occurrence belt. The ore bodies of the northern belt are smaller than those found in the southern belt (the southern belt being located in the southern third of the San Rafael Swell) outside of the WSA. The northern belt parallels the San Rafael River. Here numerous uranium mines and occurrences are reported from within the WSA, chiefly along the northeastern and east-central border. Production from each of these mines has generally been less than 500 tons of

uranium oxide. On this basis, SAI has rated the WSA with a high potential for moderate-sized uranium/vanadium deposits (500 to 1,000 tons of refined uranium oxide). The Chinle Formation outcrops on the eastern side of the WSA. To the west the depth of this formation increases. With most of the surface deposits probably discovered, additional discoveries would be subsurface and within the deeper western areas. Costs for exploration and drilling would be increased in this area as the overburden increased.

Manganese

Manganese deposits in the area are small, low-grade, and occur in the Morrison and Summerville Formations. The nearest known deposits are 6 miles north of the WSA. The chief host rocks for manganese have been eroded from the WSA. The less favorable Chinle Formation outcrops within the WSA and, on this basis, the low SAI rating indicates a deposit size of up to 100,000 tons of ore averaging 40-percent manganese. However, the SAI report also indicated that the WSA is most likely favorable for only very small accumulations.

Copper

Copper is usually associated with uranium deposits in the San Rafael Swell. The only exception is in the Copper Globe Mine located about 3 miles south of the Sids Mountain WSA. The mine produced 2 or 3 tons of ore between 1915 and 1920 and only has produced mineral specimens and jewelry pieces since then.

The SAI rating indicates a low potential for copper deposits in the WSA; if found, these deposits would be small in tonnage (less than 50,000 tons of contained copper).

Gypsum

The Carmel Formation is reported to contain a bed of industrial-grade gypsum in the southern portion of the WSA. The BLM has given gypsum a favorability rating indicating a moderate potential of occurrence. If a deposit does exist within the WSA, it likely would be less than 5 million tons. It is unlikely that any gypsum would be developed due to market conditions, small size of the deposit, and location.

Hydropower Sites

A survey of potential hydropower sites in Utah indicated that no potential sites have been identified in the WSA (SAI, 1982).

SALABLE MINERALS

Sand, gravel, and building stone are present along the San Rafael River. Surface collection of building stone has occurred just outside the WSA,

SIDS MOUNTAIN WSA

to the east along the river road. Demand is limited and the present area is adequate. While sand and gravel deposits occur, they are not of commercial interest due to their location.

Wildlife

The Sids Mountain WSA provides habitat for a limited number of wildlife species. Except for the San Rafael River and a variety of seeps and springs, the WSA lacks the perennial water sources needed for a variety of wildlife species. Rock potholes are a good source following rain, but they cannot be relied upon year-round by wildlife because they dry up during extended drought periods. During the winter, snow (when available) can provide water. Vegetation is also limiting due to low density and limited species composition.

The WSA provides habitat for low density populations of mule deer (less than one deer per square mile). Twenty-four desert bighorn sheep were reintroduced into the WSA in 1978 and 1979. In December 1983 the Utah Division of Wildlife Resources (UDWR) reported a sighting of 36 uncollared individual bighorn sheep (indicating offspring from the original transplants), accounting for a population of at least 60 desert bighorn sheep. Currently, the WSA provides habitat for 100 percent of the present population of desert bighorn sheep in the north San Rafael herd. UDWR has determined the carrying capacity for the north San Rafael herd to be up to 1,444 animals. The entire WSA is considered crucial yearlong desert bighorn sheep habitat.

The WSA provides habitat for coyotes, bobcats, cottontail rabbits, blacktail jackrabbits, woodrats, ring-tails, badgers, Ord kangaroo rats, gray foxes, white-tail antelope ground squirrels, chipmunks, rock squirrels, bats, mice, voles, shrews, striped skunks, weasels, and red foxes.

Habitat for various small bird species is found within the WSA. The species diversity and population sizes are small due to the lack of a diverse habitat. The San Rafael River canyon, along with the various cliffs and canyons throughout the WSA, provide many nesting, roosting, and foraging opportunities for avian fauna. Few individual raptors are found in the WSA. Of those, golden eagles (sensitive species), prairie falcons, American kestrels, red-tailed hawks, ferruginous hawks (candidate species under status review by FWS), and rough-legged hawks are the most common. The entire WSA is considered by UDWR as yearlong raptor habitat. Waterfowl and shore birds exist where the San Rafael River flows

through the WSA. Chukars may be found, but none have been sighted. Mourning doves are also found in the WSA.

Mountain lions may occasionally visit the area, but with low deer numbers they would be a rare occurrence. No documented sightings are recorded.

Several species of snakes and lizards could be found in the WSA. The side-blotched lizard, collared lizard, leopard lizard, short-horned lizard, sagebrush lizard, western fence lizard, and common tree lizard are the most common. Great Basin gopher snakes, striped whipsnakes, and western rattlesnakes account for the most common snakes. The Woodhouse's toad and Great Plains toad are representative of the amphibians.

The San Rafael River flows for about 18 miles through the northern part of the WSA. This portion of river has been classified by UDWR as a limited value, nongame Class 5 stream needing yearlong protection. Black bullheads, speckled dace, flannel-mouth suckers, bluehead or green suckers, round-tail chubs, and red shiners are the fish species found in the river. Tadpole shrimp (a crustacean) may be present in the various seeps, springs, or potholes.

UDWR has designated 23,360 acres as potential peregrine falcon (an endangered species) habitat in the WSA. Undocumented reports and documented sightings by UDWR indicate their presence. Bald eagles, also endangered, may be found along the San Rafael River during the winter. UDWR has designated 10,405 acres as potential eagle habitat. Bald eagles have been sighted west of the San Rafael Campground.

Forest Resources

The dominant forest type is pinyon-juniper woodland, found on 72,598 acres within the WSA. This community is used commercially throughout the Southwest for firewood, fenceposts, and Christmas trees. Because of the remoteness from populated areas and availability of products closer to population centers, BLM does not allow any of these uses in the WSA.

There are small pockets of Douglas fir in this area, concentrated around steep heads of canyons and at higher elevations on Sids Mountain. Because of its remote, rugged location and small volume, this forest species is not commercially usable.

SIDS MOUNTAIN WSA

Livestock and Wild Horses/Burros

The Sids Mountain WSA contains portions of 14 grazing allotments. Table 8 gives data on allotments and grazing use within the WSA.

Range improvement projects in the WSA are limited to one fence, two reservoirs, one tank, one trough and pipe, one trail, and livestock management access routes. The access routes follow wash bottoms and major canyon drainages, including the North and South Forks of Coal Wash, Saddle Horse Canyon, Secret Mesa, Bullock Draw, and Eagle Canyon. These are used frequently by the ranchers as well as recreation ORVs. There are no known plans for new livestock developments within the WSA.

Wild horses or burros are not known to exist within the WSA.

Visual Resources

The Sids Mountain WSA is composed of an intricate drainage system that flows to the north, eventually intersecting a main-stem drainage, the San Rafael River Canyon. The river drainage, known as the Little Grand Canyon, cuts its way in a southeasterly direction through 1,000-foot walls of sandstone. The entire landform pattern gives the WSA one of its most outstanding visual qualities.

The many canyons of the WSA vary in visual character from wide, open wash bottoms with little color variation to deep, narrow, and rough canyons with vertical or steeply stepped walls. In some instances the scene can involve a long open view of the wash bottom and its canyon walls gently rising above, or an enclosed view dominated by red-and-gold sandstone walls.

TABLE 8
Livestock Grazing Use Data

Allotment	Class of Livestock	Number of Operators	Season of Use	Total AUMs ¹	Total Acres ¹	Percent of Allotment in WSA	Percent of of AUMs in WSA	AUMs in WSA
Buckhorn	Cattle	14	04/16 to 10/15	2,730	46,205	Less than 1	0	0
	Sheep	1	11/16 to 02/15	220				
Fullers Bottom	Cattle	4	03/16 to 06/15 11/01 to 12/31	772	11,707	16	16	125
Salt Wash	Cattle	11	03/01 to 06/20 11/05 to 01/04	2,996	39,665	3	3	92
McCarty Canyon	Cattle	3	03/01 to 04/30	174	5,482	91	93	161
North Sids Mtn.	Horse	1	08/01 to 05/31	90	3,420	89	100	90
South Sids Mtn.	Cattle		05/06 to 10/15	165	7,920	100	100	165
North Sinbad	Cattle	8	11/01 to 05/10	3,200	39,314	3	3	91
North Sid & Charley	Cattle	2	03/01 to 04/30	1,010	11,421	15	17	171
Mesquite Wash	Cattle	1	04/01 to 06/20	115	3,515	100	100	115
Saddle Horse	Cattle	2	03/01 to 05/31 06/01 to 08/31	222	10,705	97	97	215
Oil Well Draw	Cattle	3	10/16 to 05/31	2,738	40,783	15	15	411
Coal Wash- Secret Mesa	Cattle	3	12/01 to 01/15 03/01 to 03/31 05/06 to 06/15	386	18,959	94	94	363
Wood Hollow	Cattle	6	03/01 to 06/15	799	16,084	35	35	280
South Sid & Charley	Cattle	1	11/16 to 06/15	52	18,638	10	10	95
Totals		60						2,374

Source: USDI, BLM, 1979a.

¹These are totals for the allotment on Federal lands. The WSA incorporates only a portion of this allotment.

The higher reaches of the WSA include secluded parks, excellent panoramic view points, and interesting landmarks and rock formations. The flatness of these parks is interrupted by sandstone monuments that rise above. Remoteness is emphasized by long-reaching views, and creative rock formations add focal points.

The entire WSA is classified as having Class A scenery containing the most outstanding characteristics of the physiographic region (Ray Mann Associates, 1977). The entire WSA has been rated high for its sensitivity level. The high level is based on the visual qualities assessed from I-70 and other prominent overviews in the area. Based on these factors, the entire 80,530-acre WSA is within VRM Class II. (Refer to Appendix 7 for a description of BLM's VRM rating system.)

Cultural Resources

There has been only one archaeological site recorded in the WSA. It is a petroglyph and remains of a possible granary. The site is not listed on the National Register; however, the potential for qualification exists. Other possible sites have been found in the WSA and have not yet been recorded. Until a complete inventory is conducted, the cultural values of the WSA remain relatively unknown.

Traditional travel routes, including the Coal Wash-Iron Wash trail, have been established through the WSA since the 1800s and possibly earlier. These were used by the Spaniards, early-day cattlemen for cattle drives, and for supply shipments throughout the remote desert region. In some places a path has been worn in the slickrock, especially near the area called the Devils Racetrack. Several inscriptions of these early travelers can be found etched on rock faces within canyon drainages.

Evidence of an old mine of historical interest is located within the central portion of the WSA. The ZCMI Mine was a venture that apparently was worked off and on over a period of years without ever producing anything of value. The mine location is described on legal forms as being in "the North Fork of Coal Wash, one-quarter mile north of Stinking Springs."

Recreation

Recreational use of the Sids Mountain WSA and surrounding terrain is varied. The most popular activities are floatboating, hiking, horseback riding, and ORV exploration.

The San Rafael River drainage has become a popular area, and floatboating has become one of the most popular attractions (estimated 1,000 visitor days annually), where recreationists using rubber rafts, canoes, kayaks, and innertubes float the spring runoff of the San Rafael River through the Little Grand Canyon. The trip can be completed in one day, and many recreationists take advantage of the spectacular scenery, cultural evidence spotted along the cliffs, and the several side canyons that extend to the river's edge. The river has been included on the Nationwide Rivers Inventory list for rivers eligible for study and possible nomination to the National Wild and Scenic Rivers system (USDI, National Park Service [NPS], 1982). The inventory found that the San Rafael River possesses deep cut canyons and excellent scenic qualities in the San Rafael Swell. About 18 miles of the river are within the Sids Mountain WSA. Since it is an inventory-listed segment, BLM must, as part of its environmental review process, avoid or mitigate adverse impacts to these creeks and consult with the NPS before taking any action that could foreclose wild, scenic, or recreational river status (Council on Environmental Quality, 1980).

When the water of the San Rafael River lowers in midsummer, hikers, backpackers, and horseback riders take to the river bottom and side canyons. A new hiking guide to Utah identifies the San Rafael River drainage as an excellent hiking venture (Hall, 1982). The intricate canyon system of the WSA also provides some excellent hiking opportunities. Recreationists have taken advantage of these canyon bottoms for access to some of the unit's higher and rugged terrain. Some of the most popular areas for hiking and horseback riding are Sids Mountain, McCarty Canyon, Saddle Horse Canyon, Salt Wash, the North and South Forks of Coal Wash, Bullock Draw, The Blocks, Virgin Springs Canyon, and Cane Wash. Approximately 85 percent (68,450 acres) of the WSA can be reached only by foot or horseback. Hiking use is estimated at approximately 1,000 visitor days annually.

ORV use occurs in and around the WSA. Motorcycle riding seems to be the most popular ORV activity; however, four-wheel driving does take place. The wide canyon bottoms of the North and South Forks of Coal Wash, Saddle Horse Canyon, and parts of Bullock Draw are driven by ranchers, mineral explorers, and recreationists (especially for organized local ORV tours). Their trails follow what is believed to be the old Coal Wash-Iron Wash trail. In early days, this trail was the main access route to the San Rafael Swell from Castle

SIDS MOUNTAIN WSA

Valley. It was used substantially as a stock drive-way and also apparently saw use by freight wagons taking supplies from Castle Valley to the southern portions of the San Rafael Desert. It has also been suggested that this trail was a portion of a very early Spanish trade route. Evidence of what is thought to be Spanish crosses drawn on a rock face in the wash also adds to the suggestion. Other areas of ORV use include Salt Wash, Secret Mesa, the Devils Racetrack, and two routes into Eagle Canyon.

The San Rafael Campground and Buckhorn Canyon, located outside the northeastern edge of the WSA, receive a tremendous amount of ORV use, especially in the spring. During some recent years, over 1,000 campers were located in the Buckhorn Canyon during the Easter weekend. A popular recreation activity with these visitors is motorcycling. Use is concentrated in Buckhorn Canyon, surrounding the campground, and in the Wedge vicinity along the northern boundary of the WSA. Total estimated ORV use in the Sids Mountain WSA is 500 visitor days annually.

In the San Rafael MFP, ORV designation for the WSA is closed in accordance with 43 CFR 8340. This includes all 80,530 acres except for existing routes. The ORV decision in the MFP states that travel on existing roads would not be restricted. Existing roads include routes through the North and South Forks of Coal Wash, Saddle Horse Canyon, the two routes into Eagle Canyon, and Buckhorn Draw. The MFP's existing roads are not the same as roads as defined by the *Wilderness Act*. Other similar areas exist outside the WSA in areas recommended open for ORVs.

Since the MFP decision in 1979, there has been concern over the negative implications of ORV closure in the resource area (especially traditional use areas such as Buckhorn Canyon) and the difficulty of enforcement (Hahn-O'Neil, 1982). Therefore, the ORV activities are being reconsidered and a recreation management plan is to be prepared that will provide more flexibility for traditional ORV use areas. In doing so, ORV recommendations in the BLM land use plans will be updated before decisions to close areas are officially implemented.

There are no recreational facilities within the WSA. A variety of foot trails and routes traverse the terrain into canyons, along wash bottoms, and across mesa tops. Many of these routes were used as traditional courses for cattle drives and supply shipments, as previously mentioned. Several mine sites and log structures (on a private in-holding) also are present within the WSA.

Twenty-two specific areas within the WSA were covered in a study on existing and potential recreation use (Barry, 1976). In general, the study indicated that primitive-type recreation activities (i.e., hiking, backpacking, river floating, and scenic viewing) have the greatest future potential. Some increased ORV activities could occur in the area; however, these ORV trails would be limited to canyon bottoms and established routes, and the opportunity would not be much different from opportunities now utilized or found in other parts of the San Rafael Swell.

Total recreation use in the Sids Mountain WSA currently is estimated at about 2,500 visitor days per year.

Wilderness Values

SIZE

The WSA (80,530 acres) is of sufficient size to enhance the wilderness values present.

NATURALNESS

The major imprints of man were excluded from the WSA by boundary determination during the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980). Imprints that remain are a stock pond and associated way, ORV trails, three mine portals, a 0.75-mile fence, about 16 miles of ORV tracks in four wash bottoms, and approximately 8 miles of ways. These imprints are pre-FLPMA, unless otherwise noted below.

A stock pond and associated way are located along the WSA's western boundary. The pond and way are used lightly during the year and do not present a substantially noticeable impact.

Buckhorn Draw, a popular and well traveled canyon, is used heavily for vehicular camping and ORV activities. Along the northeastern boundary of the WSA are vehicular camping areas and associated ORV trails. Trash and fire rings tend to accumulate during the heavy-use spring months.

Two mine shafts are located in the northeast part of the WSA along Cane Wash. One other shaft can be found along the San Rafael River in the northwest part of the WSA. All three mine shafts date back to the 1950s. Erosional processes and vegetation cover surrounding these imprints have made them substantially unnoticeable.

Approximately 0.75 mile of fence made of cedar post, green steel posts, and barbed wire enters the WSA along the western border near Wood Hollow. The fence has been identified as being substantially unnoticeable.

About 16 miles of wash bottom are used periodically by ORVs. During periods of little rain, ORV tracks are noticeable. After rains and when these drainages flood, the ORV tracks are erased.

Located near Mesquite Wash is a way extending about 1.5 miles into the WSA. The way is kept noticeable by occasional vehicular traffic, mostly associated with livestock management activities and ORV recreation. Also, another way, about 3.5 miles long, heads into the Secret Mesa area of the WSA. The way is mostly evident for approximately 2 miles from the WSA's southern boundary and washes out in several spots from there on. The route is kept evident by a small amount of intermittent use. Located west of the Secret Mesa way is another travel route into Eagle Canyon. The route is approximately 3 miles in length and is used by ORVs and motorcyclists venturing into Eagle Canyon from Justensen Flat or from the Utah Department of Transportation (UDOT) maintenance shed near I-70. The route is very evident and maintained by consistent vehicle use.

These imprints combined, except for the travel route into Eagle Canyon, cover approximately 5 percent (4,000 acres) of the WSA, but are considered substantially unnoticeable; therefore, they meet the naturalness criterion for areas under wilderness review. The route into Eagle Canyon (426 acres) is substantially noticeable and does not meet the naturalness criterion. The remainder of the WSA (76,104 acres) is natural and considered unspoiled in character.

SOLITUDE

The WSA offers outstanding opportunities for solitude. The many incised drainages allow travel through deep-walled canyons where the user can easily experience seclusion and isolation. The twisting character of the canyons and cliffs effectively screen lines of sight and suppress sounds. Some of the major drainages (i.e., Saddle Horse, Buckhorn, the North and South Forks of Coal Wash, and Bullock Draw) have wide, straight portions where screening and suppression of sounds are not afforded. Intrusions and influences outside the WSA are essentially nonexistent within the canyons, except the drainage of Eagle Canyon. There is about 0.25 of a mile impacted by the continual sounds of traffic on I-70. Beyond the travel route into the drainage to the northwest, sounds become less evident and sights of vehicles usually are not apparent except on the occasional days when ORV use is high.

The higher reaches of the WSA, consisting of rolling park lands, sandstone knobs, and interesting rock formations, are intermittently open and

provide vantage points of the vast terrain. To the north and south are views of the varied canyons of the San Rafael drainage. The lower benchland of the Swell can be seen to the east, along with a vast view of Window Blind Peak, Assembly Hall Peak, Mexican Mountain, and the Book Cliffs. To the west, the scenery is dominated by the rising mesas of red ledges, the colorful character of the desert badlands, and by the distant Wasatch Plateau. Vegetation cover varies from grass to ponderosa pine, and at times does not effectively screen visitors. The rolling terrain and topographic character of the interesting rock formations and knobs, however, do allow for separation and the feeling of seclusion. With an expansive view of the surroundings, a recreationist can experience the feeling of remoteness.

From specific points within the WSA, several dirt roads, traffic on I-70 (adjacent to southern boundary), and the two powerplants in Huntington and Castle Dale can be seen. These outside sights do not necessarily intrude upon the visitor's solitude and their observation may actually, as a comparison, emphasize the remoteness of the recreational experience. Traffic sounds from I-70 can be heard from specific points within the WSA. The level and intensity, however, do change with weather conditions and the position of the listener. In general, only those spots that are open, in direct line, and adjacent (within less than 2 miles) to the highway are affected, and may diminish opportunities for solitude.

In summary, in over 95 percent of this WSA (76,530 acres) the opportunities for solitude are outstanding. In about 5 percent of the WSA (4,000 acres), opportunities for solitude are not outstanding. These include the wide major wash bottoms, Buckhorn Canyon, and a portion of Eagle Canyon.

PRIMITIVE AND UNCONFINED RECREATION

In the spring, high water levels in the San Rafael River offer an outstanding opportunity for one to float the scenic passage of Little Grand Canyon. During low water periods, hiking the canyon becomes a popular activity. Many organized and educational groups take advantage of the recreation opportunity along the San Rafael River.

Outstanding opportunities for hiking, backpacking, horseback riding, rock scrambling, photography, art, and scenic viewing await the explorer in the majority of the WSA. Many isolated springs and pools of water during parts of the year provide an element of contrast to the dry, desolate character of the WSA. The interesting nature of the rock formations and canyon drainages with

SIDS MOUNTAIN WSA

their sheer-walled cliffs, arches, knobs, pinnacles, twisted passages, and historic and prehistoric remnants all contribute to a high quality recreational experience.

The Sids Mountain WSA offers the unusual opportunity for floatboating along the San Rafael River, plus the several other outstanding opportunities for recreation experiences throughout all 80,530 acres.

SPECIAL FEATURES

Special features found in the WSA are archaeological, historic, scenic, geologic, ecologic, and wildlife values. They include known and suspected sites of the Fremont Indian culture that have not been recorded and historic travel and trade routes. Also included is habitat for 12 proposed sensitive or endangered plant species and one designated endangered plant species. Wildlife values include reintroduced desert bighorn sheep, peregrine falcon habitat, and eagle habitat. Scenic values include the colorful and dramatic rock forms in the intricate canyon drainages. Geologic values include the several formations exposed during the uplift of the San Rafael Swell.

Land Use Plans and Controls

The State of Utah owns seven sections of land (4,391.32 acres) within the WSA. It is State policy that State in-holdings (surface and mineral) be exchanged from designated wilderness areas (refer to Volume I). State lands are leased for livestock grazing and minerals. Two State sections are located atop the Sids Mountain proper, and traditional access to this area has been by two foot paths from Saddle Horse Canyon. The other in-held State sections can be accessed by wash bottoms within the WSA.

All other lands within the WSA are public lands with both surface and mineral estates managed by BLM.

There are no recreational or other withdrawals in or adjacent to the WSA. Two public water reserves (No. 16 and 107 BLM) are within the WSA. These withdrawals have been in effect since March 1914 and cover about 860 acres. The withdrawals affect only the location of claims for nonmetalliferous minerals (e.g., gypsum). No other withdrawals exist within or adjacent to the WSA.

There are no valid rights-of-way in the WSA. Two applications have been received from the UDOT for lands adjacent to the WSA. One is for a material site right-of-way and the second is for the UDOT maintenance shed. The right-of-way for I-70 makes up the southern boundary of the WSA for approximately 2 miles.

Physical and legal access to the WSA is provided by Emery County roads along the northern, western, and southwestern boundaries of the WSA, I-70 on the south, and BLM-maintained roads in the north, west, and south portions of the WSA.

There are no contiguous lands under consideration by other agencies for wilderness.

The area of the WSA is managed in accordance with the San Rafael MFP (USDI, BLM, 1979a). It has been identified for multiple-use management by the BLM. The area has also been identified for its special values to be considered further as a potential ONA or ACEC. Wildlife management efforts in the WSA by UWDR include crucial wildlife transplants and habitat identification.

In the *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984) the WSA area was zoned for mining and grazing uses. Wilderness designation or nondesignation is not specifically addressed in this plan. Recently, the Emery County Economic Development Council has been investigating the possibility of proposing National Park status for Mexican Mountain and Sids Mountain WSAs to preserve environmental values while maximizing tourism and related local economic returns.

Socioeconomics

DEMOGRAPHICS

The WSA is located in the south-central portion of Emery County. Socioeconomic effects related to the WSA are of concern to Emery County, with some interest in Carbon County.

Emery County had a population of 12,900 in 1982 (U.S. Department of Commerce [USDC], Bureau of the Census, 1981), not quite 1 percent of the State population. Most of the population occurs in Castle Valley, the northwestern part of the county. There are two service centers in northwestern Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316). Other towns in Castle Valley are Elmo (1980 population of 300), Cleveland (1980 population of 522), Orangeville (1980 population of 1,309), Ferron (1980 population of 1,718), and Emery (1980 population of 372). The Town of Green River is located in the southeastern part of the county and had a 1980 population of 1,282. Ferron is the community closest to the Sids Mountain WSA.

Emery County contains 4,449 square miles of land or about 2.8 million acres. About 81.7 percent of the county is owned by the Federal Government, 10.7 percent by the State, and 7.1

percent by private residents. The WSA includes about 2.9 percent of the acreage in the county.

EMPLOYMENT

Statistics (USDC, Bureau of the Census, 1981) indicate that almost half of the county income and about 40 percent of the employment is from mining, mostly of coal (refer to Table 9). Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important sources of employment and income. Agriculture accounts for 0.6 percent of the county income and less than 1.0 percent of the total employment.

TABLE 9
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate	1	1
Services	2	6
Other	-	-
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated. Tourism is included as part of Services, Retail Trade, and Other Services.

During 1970-1980, Emery County experienced the largest percentage change in population, increasing by 109.7 percent—5,137 to 11,451. This increase was caused by construction of the

powerplants mentioned above and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at various times during the county's history. Since 1982 the local coal industry has been in a slump. Despite a 17-percent decrease in employment between 1981 and 1983, it remains the largest employer in the area (Utah Department of Employment Security, 1981 and 1983).

INCOME AND REVENUES

Past activities in the WSA that could be of local economic consequence include mineral activity, livestock production, hunting, and dispersed recreation.

Production from mines and prospects within and adjacent to the WSA has brought some temporary employment to residents of the area (approximately 1 work year). The WSA has 266 mining claims that appear current in their assessment work. Regulations require a \$100 annual expenditure per claim for labor and improvements. Some of these expenditures are made within the local economy.

Sixty livestock operators have grazing privileges in the WSA. Based on the consumption of 2,374 AUMs of forage by cattle, it is estimated that the WSA accounts for \$47,480 of livestock sales, including \$11,870 of ranchers' returns to labor and investment.

The WSA supports significant private (both motorized and nonmotorized) and intermittent commercial recreation use. Recreation-related expenditures are well distributed among most businesses in the area and could only be significant to those commercial outfitters using the area. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Sids Mountain WSA is estimated as about 2,500 visitor days per year resulting in total estimated expenditures of \$10,250 annually. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Emery County.

The WSA generates Federal revenues from two sources: grazing and mineral leasing. Within the WSA, about 14,160 acres are currently leased for oil and gas. At \$3 per acre, this generates about \$42,480 annually. Half of this, or about \$21,240, is allocated back to the State of Utah. The State then

SIDS MOUNTAIN WSA

reallocates these revenues to various funds, the majority of which are related to energy development. Based on 2,374 AUMs of forage consumed by livestock in the WSA and a grazing fee average of \$1.40, the WSA annually accounts for \$3,324 of grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM District for the construction of range improvement projects.

Table 10 summarizes income and revenue related to the Sids Mountain WSA.

TABLE 10
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$42,480
Mining Claim Assessment	\$26,000	None
Livestock Grazing	\$47,480	\$3,324
Recreational Use	Less than \$10,250	None ²
Total	Less than \$84,330	Up to \$45,804

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

²Intermittent commercial use is low and Federal revenues are not significant.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions

placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of the area would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas, tar sand, and locatable mineral exploration and development and continued ORV use in concentrated areas of the WSA. Even though the area would be open to resource use and development without control for wilderness protection, it is likely that little overall development of mineral resources would occur within the foreseeable future. This is due to the area's rough and restrictive terrain and the relatively low current interest in exploration and development. In addition, 70 percent of the WSA is closed to leasing and 93 percent is already closed to surface occupancy for extraction of leasable minerals. ORV use in concentrated areas within and adjacent to the WSA would be expected to increase; however, ORV use is restricted to existing routes on 98 percent of the WSA.

The following is a worst-case analysis, assuming that minerals would be developed sometime in the future and would result in the following disturbance: oil and gas, 160 acres; uranium-copper, 40 acres; manganese, 130 acres; and potash, 40 acres. This would total 370 acres. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.) Even though 2,500 acres of the WSA would be available for competitive combined hydrocarbon leasing, the leasing categories for these specific acres are restricted to Category 3 (open with no surface occupancy) and Category 4 (no leasing) to protect the scenic and natural values of the area. Thus, tar sand development would not be expected to occur even without wilderness designation.

AIR QUALITY

The Sids Mountain WSA would continue to be managed as a PSD Class II area. Disturbance of 370 acres could result in increases of fugitive dust emissions, especially while activities were in progress. This could add to occasional periods of haze in the region; however, the magnitude of the contribution would be insignificant.

GEOLOGY

Although surface disturbance in relation to mineral exploration and development is estimated at 370 acres within the WSA, this level of disturbance is not expected to result in impacts to geology. This is because activities would not result in any large modification to geologic formations through subsidence or fracturing.

SOILS

It is estimated that up to 370 acres of soil could be disturbed by mineral exploration and development. The average annual rate of soil loss would increase from 0.6 to 4.6 cubic yards/acre; therefore, soil loss on the 370 acres would increase from 222 cubic yards/year to 1,702 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 1,480 cubic yards (3 percent) over current annual soil loss. The likelihood of this occurring is low because soils subject to severe or critical erosion tend to occur as pockets of fine sandy soil and can be avoided, except in traveled wash bottoms. Also, estimated surface disturbance of that magnitude is not expected to occur due to the low mineral potential in the area. Therefore, impacts related to soils would not be significant.

VEGETATION

The anticipated maximum of 370 acres disturbed could impact the vegetation of the WSA, especially if disturbance were to occur in the form of roads and drill pads. The likelihood of this magnitude of development is low. Impacts to most of the sparse vegetation of the WSA would not be significant; however, any impacts to the 480 acres of riparian vegetation could have adverse effects on wildlife.

Eight species of candidate, proposed endangered, or endangered plants are found in or near the WSA. Site-specific clearances would be conducted prior to any authorized surface-disturbing activity on the estimated 370 acres. If these species could be affected, BLM would initiate Section 7 consultation with the FWS as required

by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of endangered or sensitive plant populations would be preserved under the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Most erosion within the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development could impact 370 acres with a soil loss increase of approximately 1,480 cubic yards/year. The turbidity and sediment impact to water resources could be locally significant if all assumed surface-disturbing activities were to occur. Low potential, rough terrain, and management restrictions, however, would limit this possibility and, therefore, the activities in the WSA likely would not have significant impacts on water quality or flows.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the Sids Mountain WSA would remain (5,760 acres in Category 1, 18,560 acres in Category 3, and 56,210 acres in Category 4). The wilderness stipulations on 9,320 acres of post-FLPMA leases would be removed and there would be an additional 10,160 acres available for lease. About 70 percent of the WSA would continue to remain closed to leasing (Category 4).

The WSA is considered low in potential for oil and gas occurrences with less than 10 million barrels of oil (3 million estimated recoverable) or less than 60 billion cubic feet of natural gas (18 billion cubic feet recoverable) existing. These oil and gas resources could be explored and developed without concern for wilderness protection. However, due to the 56,210 acres in Category 4, about two-thirds of the recoverable oil and gas resources in the WSA would be foregone.

Due to the low potential and interest in the area, rugged terrain, and management restrictions, indications are that significant oil and gas development would be unlikely.

Tar Sand

The potential exists for less than 10 million barrels of oil to be yielded from tar sand within the WSA. Of this, only 3 million barrels are considered

SIDS MOUNTAIN WSA

recoverable. Present information from the existing deposit suggests tar sand development in the WSA is not likely. No leases for tar sand exist within the WSA and, due to leasing Category 3 and 4 restrictions, future leasing for tar sand is not anticipated for the 2,500 acres of the Sand Rafael Swell STSA within the Sids Mountain WSA.

Potash

Up to 1 million tons of potash may be present in the WSA. Of that, up to about 750,000 tons could be considered recoverable. Leasing restrictions would be enforced throughout the WSA to protect the scenic and primitive qualities identified in the area. The rugged surface of the WSA, high prices, and more feasible areas in the general region indicate that interest in exploration, leasing, or development of the potash resource is unlikely.

Geothermal

Due to low water temperatures and distance from potential users, no development of geothermal resources is anticipated; however, with this alternative, leases could be issued without wilderness consideration.

LOCATABLE MINERALS

Locatable mineral development could occur within the WSA because the entire area would remain open to mining claim location. The potential recovery of small quantities of uranium oxide, vanadium, copper, lead, zinc, cobalt, chromium, nickel, molybdenum, strontium, and silver could be possible, although the likelihood of commercial quantities of most of these minerals is very low. Gypsum and manganese in the WSA are not likely to be extracted. Even for the minerals listed (uranium, vanadium, copper, manganese, etc.) the current market conditions suggest that no mineral production would occur in the WSA within the near future; however, with this alternative, these minerals, should they exist in commercially minable deposits, would be available for recovery without wilderness limitations if future market conditions should change.

Surface deposits have been explored and sub-surface deposits might be located; however, due to rough terrain and deep-seated locations, extensive drilling and mining efforts likely would be required.

Salable Minerals

With this alternative, no use of salable materials (gravel, building stone) from within the WSA is anticipated.

WILDLIFE

Wildlife species, particularly those sensitive to surface disturbance or human interference, could

be adversely affected by possible surface disturbance associated with energy and mineral exploration and development (370 acres), especially if it were to occur in the form of roads or drill pads. Species most likely to be affected would be bighorn sheep and nesting raptors, including golden eagle and peregrine falcon.

About 80,530 acres of the WSA are considered bighorn sheep range and about 23,360 acres as potential peregrine falcon habitat. Approximately 10,405 acres are considered potential habitat for bald eagles. Raptor nesting along cliffs adjacent to vehicle use areas would be adversely affected where ORV activities were concentrated.

It is concluded that bighorn sheep and raptors could be adversely affected if 370 acres of potential surface disturbance occurred within the WSA. Impacts could be short term while projects were taking place; however, increased access to the area could cause long-term impacts. Reclamation measures might not benefit these sensitive species. It is unlikely, however, that the entire amount of estimated surface disturbance would occur due to questionable potential, rugged terrain, and management restrictions. In addition, oil and gas category restrictions and ORV closures would protect most of these habitats from surface disturbance. As a matter of BLM policy, golden eagles (BLM sensitive species), ferruginous hawks (candidate species), peregrine falcons (endangered) and bald eagles (endangered) would be protected from disturbance related to oil and gas and locatable mineral exploration and development (refer to Appendix 4). Disturbance of these species by ORV use would continue.

Increased ORV use would continue and could expand beyond traditional travel routes. Habitat and wildlife species would be adversely affected by this increase.

It is concluded that bighorn sheep and raptors could be adversely affected if 370 acres of potential surface disturbance occurred within the WSA. Impacts could be short term while projects were taking place; however, increased access to the area could cause long-term impacts. Reclamation measures might not benefit these sensitive species. It is unlikely, however, that the entire amount of estimated surface disturbance would occur due to questionable potential, rugged terrain, and management restrictions. In addition, oil and gas category restrictions and ORV closures would protect most of these habitats from surface disturbance. As a matter of BLM policy, golden eagles (BLM sensitive species), ferruginous hawks (candidate species), peregrine falcons (endangered) and bald eagles (endangered) would be protected from disturbance related to oil and

gas and locatable mineral exploration and development (refer to Appendix 4). Disturbance of these species by ORV use would continue.

Increased ORV use would continue and could expand beyond traditional travel routes. Habitat and wildlife species would be adversely affected by this increase.

FOREST RESOURCES

There is a limited source of trees within the WSA, but occasional use of firewood by campers and hikers would continue to occur. Surface-disturbing activities could have an impact on those species present; however, reclamation efforts could offset this over the long term. Impacts to the forest resource would be insignificant.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the San Rafael MFP. The 2,374 AUMs currently allocated in the WSA are assigned to 60 livestock permittees. Existing range facilities (one fence, two reservoirs, one tank, one trough and pipe, and one trail) could be maintained by mechanical methods. Motorized vehicles are currently being used within the North and South Forks of Coal Wash, Saddle Horse Canyon, Bullock Draw, and Eagle Canyon to manage livestock in the WSA. With this alternative, motorized vehicle use along these routes could continue for livestock-related activities. New rangeland developments could be implemented without wilderness considerations. Although none are now planned, additional roads or other facilities for livestock management and use could be proposed and developed in the future.

VISUAL RESOURCES

With this alternative, visual quality in the Sids Mountain WSA would be managed by limitations placed on potential surface-disturbing activities (i.e., about 80,530 acres would continue to be closed to ORV use except for existing roads, trails, and wash bottom ways; 18,560 acres would be leased with no surface occupancy and 56,210 acres would be closed to leasing; and 80,530 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, with this alternative, it is also assumed that 370 acres of potential mineral-related exploration and development might occur. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality would be degraded in localized areas during the period of activity. VRM objectives in disturbed areas probably would not be met in Class II areas

during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If mining claims and associated roads are located in scattered locations throughout the WSA (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. This magnitude of disturbance, however, is unlikely.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 370 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to surface disturbance. Inadvertent loss or damage could occur in the disturbed areas or where annual assessment work on mining claims takes place. Vandalism of sites could increase. There are no existing National Register sites within the WSA; however some of the sites do have National Register potential.

RECREATION

Approximately 80,530 acres would remain closed to ORV use (except for existing roads and trails that equal about 1,520 acres) in accordance with the San Rafael MFP. Total ORV and recreational use associated with vehicles in the WSA is estimated at 500 visitor days per year.

Primitive recreation values would be foregone within the 370 acres where potential mineral and energy related surface-disturbing activities could take place. If roads to private in-holdings are constructed, the quality of the primitive recreation in the vicinity would be reduced.

Primitive recreation use in the WSA is estimated at 2,000 visitor days per year and includes such activities as floatboating, hiking, and horseback riding.

The future trends in recreational use of the Sids Mountain WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent/year over the next 20 years. At this rate overall recreational use is expected to increase from 2,500 current visitor days/year to 3,725 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 2,000 visitor days/year to about 2,980 visitor days/year over the next 20 years. Likewise, recreational

activities utilizing vehicular access would increase from about 500 visitor days/year to 745 visitor days.

Some of the estimated 370 acres of surface disturbance that could occur in the future would degrade naturalness, solitude, and scenic values in localized areas, including areas along the San Rafael River, a Nationwide Rivers Inventory listed segment. If the area is not designated wilderness, the current approved land use plans would determine land management direction for recreation and other activities. Within the WSA the segment of the San Rafael River with potential for study and addition to the National Wild and Scenic Rivers System would continue to be managed under the provisions of the August 2, 1979, Presidential Memorandum regarding Wild and Scenic Rivers and National Trails. An August 10, 1980, Council of Environmental Quality Memorandum outlines specific actions for interagency consultation to avoid or mitigate adverse effects on rivers in the Nationwide Rivers Inventory. These procedures are required as part of the environmental analysis process regarding any proposed action that could impact an inventory river. The wild and scenic values of the river would be considered in consultation with NPS but would not necessarily receive added protection.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the San Rafael MFP. With this alternative, wilderness values in the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e., about 80,530 acres would be closed to ORV use, except for existing roads and trails; 18,560 acres would be leased with no surface occupancy and 56,210 acres would be closed to leasing; and 80,530 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, with this alternative, 370 acres of potential mineral exploration and development are estimated. The related surface disturbance would result in a significant loss of naturalness, solitude, and outstanding opportunities for primitive and unconfined recreation where roads and pads could be located. The potential for this type of disturbance, however, is questionable and oil and gas related disturbance would be restricted to 7 percent of the WSA acreage.

ORV use could increase on existing routes, but management restrictions would preclude establishment of new ORV trails. This increase would degrade portions of the outstanding solitude

opportunities found on about 76,530 acres of the WSA and would have an impact on the outstanding opportunities for primitive recreation values where conflicts between ORV and primitive recreation activities may occur.

Special values, such as scenic, wildlife, and cultural features, could be diminished by surface disturbance. As vehicle access and ORV use increase, vandalism of cultural resources similar to that occurring in adjacent areas (i.e., Buckhorn Draw) could take place.

LAND USE PLANS AND CONTROLS

To the extent use and permitted development degrade habitat quality, this alternative would not be consistent with peregrine falcon and bighorn sheep management plans of the State of Utah (UDWR). It would be consistent with Emery County zoning. This alternative would be consistent with the BLM San Rafael MFP. The option of National Park status for the WSA as being considered by the Emery County Economic Development Council would remain open. However, disturbance of 370 acres in portions of the WSA could reduce the potential of the area for National Park status.

SOCIOECONOMICS

With this alternative, no changes are expected in existing patterns and trends of population, employment, and personal income. The existing economic potential in the WSA would not be affected by wilderness designation constraints; however, this potential would continue to be limited by other factors. Local income related to existing mining claim assessment (refer to Table 10) could continue and increases in income could occur if new mining claims are located in the WSA. The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, as noted previously, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained.

The \$42,480 per year in Federal oil and gas lease revenues generated within the WSA could continue and could be increased by as much as \$30,480 with additional leasing of 10,160 acres.

Domestic livestock grazing (2,374 AUMs) would continue as authorized in the San Rafael MFP with related income and revenues as shown on Table 10.

Local expenditures related to recreation would continue and could increase from \$10,250 to \$15,273, for a net increase of \$5,023.

Overall, the local economic impact would be considered insignificant although the future potential for increases would remain.

All Wilderness Alternative (80,530 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 80,530-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). All 80,530 acres would be closed to vehicular use, except for approvals by BLM as discussed in the Description of the Alternatives section. About 27 miles of existing vehicular ways, ORV trails, and wash bottoms would not be available for vehicular use except as indicated above. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed, causing an estimated 170 acres of disturbance within the WSA. Disturbance from any future access to private land in-holdings is assumed to be included in this figure. It is assumed also that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing (including tar sand and potash) would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas for this alternative would be only 170 acres, compared to 370 acres under the No Action Alternative, the impacts from development and surface disturbance on air quality, geology, water resources, and forest resources under the All Wilderness Alternative would be insignificant, as described for the No Action Alternative. Wilderness designation would provide additional protection to these resources.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities. Soil loss on 170 acres would increase from 102 cubic yards/year to 781 cubic yards/year. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, with this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 680 cubic yards (1.4 percent), as compared to 1,480 cubic yards (3 percent) with the No Action Alternative.

VEGETATION

Additional access and disturbance in the WSA due to exploration and development of mining claims would be only 170 acres, compared to 370 acres with the No Action Alternative. The potential of even 170 acres of disturbance is questionable with this alternative. As a result, vegetation would not be significantly impacted. ORV use along traditional routes is expected to be discontinued with this alternative and this would have a positive impact on habitat for the threatened, endangered, or sensitive plant species noted in the Affected Environment, Vegetation section. It is concluded that, with wilderness designation, these threatened, endangered, or sensitive species would be less likely to receive inadvertent impacts than with the No Action Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

No production of oil and gas is presently taking place within the WSA. According to SAI (1982), the potential exists for production of up to 3 million barrels of oil or less than 18 billion cubic feet of natural gas that may be recoverable from somewhere within the WSA. Wilderness designation of the area would result in lost opportunity for this recovery. However, since about two-thirds of the WSA would continue to be closed to leasing with the No Action Alternative, only one-third of the recoverable oil and gas would be foregone as a result of wilderness designation.

Tar Sand

The potential for the occurrence of tar sand within the Sids Mountain WSA is high for small deposits. About 10 million barrels of oil in-place exist and, of that, 3 million barrels are considered recoverable and could be foregone with this alternative. Present information, however, does not suggest production is likely; therefore, wilderness designation would not significantly affect tar sand development potential in the WSA.

Potash

The potash-bearing rocks in the WSA are expected to be low-grade, thin, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere. With this alternative, the WSA would not be leased for potash. It is assumed that there are less than 750,000 tons of recoverable potash that would be foregone. This would not be significant due to the extensive potash resources elsewhere in the region.

Geothermal

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

Locatable Minerals

There are 803 mining claims covering 10,500 acres (13 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void.

Uranium/vanadium-bearing strata are known to occur in the WSA; however, the ore bodies are thought to be small to moderate in size, scattered, and, subsurface in nature.

If minerals are located prior to wilderness designation, it is estimated that up to 170 acres could be disturbed due to exploration and development of the locatable mineral resources, primarily uranium and manganese. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case the potential for recovery of 500 to 1,000 tons of uranium, less than 50,000 tons of copper, and less than 100,000 tons of 40-percent manganese would be foregone. Other minerals that may be associated with uranium (such as zinc, lead, silver, etc.) also could be foregone, although there is low likelihood for these to be present in significant amounts. The gypsum potential also is low but would be foregone. After designation, all lands not under claim (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981).

Because production of these minerals is not currently occurring and economic considerations are unfavorable, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Therefore, this alternative would probably not result in any significant loss of recoverable gypsum, manganese, uranium, and associated mineral resources.

Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these materials within the WSA is predicted.

WILDLIFE

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat. Bighorn sheep populations would be expected to expand due to habitat protection afforded over the 80,560 acres of range.

Raptor nesting along cliffs adjacent to heavily used vehicle routes in the major canyons of the Sids Mountain WSA would continue to be affected by human activities. The 23,360 acres of potential peregrine falcon (endangered) habitat and 10,405 acres of raptor nesting habitat in the WSA including habitat for golden eagle (sensitive species), ferruginous hawk (candidate species) and bald eagle (endangered), would be protected. This would avoid abandonment of nests and encourage future nesting.

There are no proposed wildlife management facilities or vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 170 acres assumed to be disturbed from mining claim activities.

Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife populations. Mining claim development projected for 70 acres could have a disruptive effect to a few animals but would not significantly affect overall wildlife conditions in the WSA.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the San Rafael MFP. The 2,374 AUMs of forage currently allocated in the WSA would remain available to existing livestock use. Existing developments (one fence, two reservoirs, one tank, one trough and pipe, one trail, and two access routes) would be used and maintained in the same manner as the past, based on practical necessity and reasonableness. Although none are now proposed, new rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that wilderness protection standards are met. Motorized vehicle use along the access routes into the North and South Forks of Coal Wash, Saddle Horse Canyon, Bullock Draw, and Eagle Canyon for managing livestock could be limited; however, wilderness designation would have no impact on the existing level of livestock use or most livestock management practices.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. With this alternative, the potential for surface-disturbing activities that could impair visual quality would be limited through management under VRM Class I, which generally allows for only natural ecological change.

The possible disturbance of 170 acres related to the development of valid mining claims could occur. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on local disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. If roads for development of valid mining claims or private in-holdings were required in highly visible locations (worst-case analysis), VRM Class I objectives might not be met on a larger portion of the WSA. Because the potential for development of mining claims is low, visual quality would probably not be reduced in the WSA as a whole.

RECREATION

The entire 80,530 acres would be closed to recreational ORV use. Motorcycling and ORV use are two popular activities in the area surrounding the WSA, and recreationists ride in portions of the WSA. Similar areas found in other parts of the San Rafael Resource Area are not proposed for closure to ORVs; however, use in the WSA has been traditionally established and, due to terrain and access characteristics, this use may be difficult to fully eliminate. Barriers could be installed to restrict most four-wheel vehicles, but occasional unauthorized motorcycle use might occur. Areas where ORV use would probably continue would be in the North and South Forks of Coal Wash, Saddle Horse Canyon, Bullock Draw, Eagle Canyon, and Buckhorn Canyon. These use areas contain specific qualities possibly not found in other substitute ORV areas.

Floatboating on the San Rafael River would be enhanced by specific wilderness management goals formulated to protect this special recreation experience. Hiking, backpacking, sightseeing, and other nonmechanized recreation activities already occurring would be protected and enhanced.

By increasing public awareness of the area, designation could result in increased primitive recreation use of the WSA. Judging from the WSA's site characteristics, population distribution about the

site, and availability of similar sites, use would increase from the present 2,500 to an estimated 16,106 visitor days/year. The nature of the use would change from about 80 percent primitive use and 20 percent ORV use at present to 100 percent primitive recreation use.

If roads for the development of valid mining claims were to occur, the quality of primitive recreational opportunities would be reduced. Because the potential for mineral production is low, the quality of the primitive recreational experience would likely be preserved. If roads to the 440 acres of private in-holdings were constructed in the future, the quality of primitive recreational opportunities would be reduced in the vicinity. The potential for such private road development is uncertain.

WILDERNESS VALUES

The entire 80,530 acres would be designated as wilderness. Wilderness values (e.g., naturalness, outstanding opportunities for solitude and primitive recreation, and special features) would be protected.

In about 98 percent of the WSA, wilderness values (e.g., outstanding opportunities for solitude, hiking, floatboating, rock scrambling, etc.) would benefit from restrictions on surface-disturbing activities. The entire 80,530 acres would be closed to ORV use; however, it is not likely to be completely eliminated from established use areas, which include the North and South Forks of Coal Wash, Saddle Horse Canyon, parts of Bullock Draw, Eagle Canyon, Buckhorn Canyon, Salt Wash, Secret Mesa, and the Devils Racetrack. Occasional ORV motorcycle use of the approximately 27 miles of tracks within these areas would impair solitude, naturalness, and primitive recreational experiences/opportunities along these routes. This would affect wilderness values on about 2 percent (2,122 acres) of the WSA. Impacts would be most significant in the spring and early summer, when most ORV use occurs.

Although potential disturbance is unlikely, up to 170 acres could be disturbed by exploration and development for locatable mineral resources. Thus, some localized degradation of wilderness values would be anticipated in disturbed areas. This degradation would be reduced through management under VRM Class I (generally allowing for only natural ecological change) and closure of the entire area to future mineral leasing and location.

Outstanding opportunities for solitude (on 76,500 acres) and primitive and unconfined recreation (on 80,530 acres) would be preserved in most

(78,260 acres) of the WSA. Special features associated with wilderness uses would benefit by designation. Established wildlife habitat for species sensitive to development would be protected, increasing the probability of sightings. Scenic values would be preserved, and cultural sites of recreational interest (known, undiscovered, or undocumented) would be protected. As previously noted, occasional unauthorized ORV use on 2,122 acres could impact wilderness values during the spring season in wash bottoms where motorcycle ORV use may occur.

Access to and use of the 440 acres of private land in-holdings would eliminate solitude, naturalness, and the opportunities for primitive and unconfined recreation on the affected areas and could reduce these values in the vicinity.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with wildlife management efforts by the State of Utah (UDWR). It would not be consistent with the Emery County zoning objectives for use of the mineral resource potential but it would not conflict with the livestock grazing aspects of the *Emery County Zoning Plan*. The option of National Park status for the WSA, as being considered by the Emery County Economic Development Council, would remain open and the park values of the WSA would be protected by wilderness designation. The existing BLM San Rafael MFP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the BLM land use plan.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

The WSA is rated as having a high certainty for moderate-sized uranium and small-sized tar sand deposits. There is a low potential for small copper, potash, manganese, and oil and gas deposits. Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low in the foreseeable future, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Future mineral-related employment foregone with designation is not expected to significantly affect local economic growth. However, local economic impact estimates are speculative because the presence of mineral resources and the future economic and technological conditions are uncertain.

Present grazing levels would be allowed and added restrictions would not be such as to prevent the maintenance and replacement of rangeland improvements. New rangeland improvements would only be allowed if they were primarily for the purposes of resource protection and management. Therefore, economically feasible improvements designed primarily for livestock (none now proposed) could be foregone with designation, along with any resulting increase in ranchers' income. Livestock use and ranchers' income would continue as at present with \$47,480 annually of livestock sales and \$11,870 of ranchers' returns to labor and investment. Federal grazing fee revenues of about \$3,324 would continue (at \$1.40 per AUM).

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide), but could increase from \$10,250 to about \$66,035 for a net increase of \$55,875 per year. These expenditures would be well distributed among businesses in the affected area and would be locally insignificant. The elimination of recreational ORV travel in the WSA would reduce related local expenditures. However, these reduced expenditures would be small and well distributed among businesses in the affected area, and would be locally insignificant.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 14,160 acres now leased would cause an eventual loss of \$42,480 per year to the Federal Treasury. The closure of 10,160 acres potentially available for lease would cause a potential future loss of \$30,480 per year to the Federal Treasury. In each case, the State would have received half of these revenues.

Partial Wilderness Alternative (78,408 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the Sids Mountain WSA for

this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 78,408-acre area designated as wilderness and the 2,122-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some of the existing mining claims would eventually be explored and developed, causing an estimated 165 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities and that tar sand competitive leasing would be denied. Oil and gas leases would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed.

It is assumed that, within the nondesignated area, 6 acres would be disturbed sometime in the future due to mineral and oil and gas development. Overall, 171 acres of surface disturbance would occur within the WSA, 199 acres less than under the No Action Alternative and only 1 acre more than with the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Impacts from this Partial Wilderness Alternative would be essentially the same as for the All Wilderness Alternative, with the exception of Recreation and Wilderness Values. Therefore, these are the only two topics discussed here.

RECREATION

The 78,408 acres designated as wilderness would be closed to ORV use, including about 5 miles of existing ORV trails. Within this area, primitive recreation values for hiking, backpacking, sight-seeing, and floatboating would be protected. Areas presently used most frequently by primitive recreation visitors would be included and preserved.

The 2,122 acres not designated as wilderness would provide ORV access corridors on about 22 miles of traditional wash bottom travel routes. The principal ORV use concentration areas would remain open.

Both primitive and ORV types of recreation would benefit from this alternative; however, there would be some conflict in types of use in the 22 miles of wash bottom areas. This conflict likely would be of greater concern to primitive recreationists than to ORV users.

With this alternative, it is projected that primitive recreation use in the WSA would increase to

about 15,680 visitor days/year due to increased publicity resulting from wilderness designation. Also, it is predicted that ORV use would increase to about 610 visitor days/year as a result of normal growth in traditional wash bottom use. ORV use would constitute about 4 percent of the total use, as compared to 20 percent at the present time. Total recreation use would amount to 16,290 visitor days/year at the end of 20 years. This would be 12,565 more than the No Action Alternative.

To some extent, the availability of ORV access would tend to disperse primitive recreation use within the WSA by providing extra trailhead opportunities.

WILDERNESS VALUES

Wilderness values in the designated portion could be effectively managed and the difficulty of preventing vehicle use on the 2,122 acres of traditional ORV use area would be avoided. However, the continuation of ORV use in the 22 miles of wash bottoms would adversely affect wilderness values in the vicinity of those travel routes. Naturalness, solitude, and primitive recreation would be impacted during the time that vehicles were present. Vehicle tracks in wash bottoms would affect naturalness, except immediately after runoff periods when they would be erased.

The ORV routes would not affect wilderness values in the WSA as a whole, even though the North Fork Coal Wash route would extend all the way across the WSA and the other routes would provide vehicle access well into the WSA. The rough terrain and confines of the wash bottoms limit ORV influence to the immediate vicinity of the travel corridors. Overall, this alternative would not provide as much protection to wilderness values as would the All Wilderness Alternative, primarily due to the differing levels of ORV use (22 miles fully open to all types of ORV use estimated at 610 visitor days/year as compared to occasional unauthorized motorcycle use).

Effects on special features would not be significantly different for this alternative than for the All Wilderness Alternative, except for an increased potential for vandalism to cultural resources on 2,122 acres due to greater ease of access.

ADDENDUM

In October of 1985 BLM acquired a 440-acre parcel of public land entirely within the Sids Mountain WSA (UT-020-023). As authorized by Sections 202 and 302 of the Federal Land Policy and Management Act of 1976, BLM reviewed these lands and found that they meet the criteria

SIDS MOUNTAIN WSA

for designation as a WSA. Called the Sids Cabin WSA (UT-060-023A), this area is very similar to the surrounding WSA with exception of a historic cowboy cabin, small corrals, and several assorted structures. Lands within the Sids Cabin WSA share the resource values and wilderness characteristics described in the analysis for Sids Mountain WSA.

Because the analysis for the Sids Mountain WSA encompasses the Sids Cabin area, a separate

analysis has not been prepared for Sids Cabin WSA. However, the area will be carried through the wilderness review as a separate WSA; public comments addressing the wilderness suitability of this area should be explicitly identified for UT-060-023A. Because identification of the Sids Cabin WSA did not occur until preparation for the Draft Utah Statewide Wilderness EIS was in the final stages, statewide acreages and other totals in Volume I do not include the lands in the Sids Cabin WSA.

BIBLIOGRAPHY

- Barry, 1976. "Potential and Existing Recreation Use in Sids Mountain Wilderness Study Area" (unpublished document). U.S. Department of the Interior, Bureau of Land Management, San Rafael Resource Area, Price, Utah.
- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Council on Environmental Quality. 1980. "Inter-agency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory" (personal communication). August 10, 1980. Washington D.C. 8 pp.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1984. *Stockpile Report to the Congress*. September 1984. U.S. Government Printing Office, Washington, D.C.
- Hahn-O'Neill, Martha G. 1982. *The Visual Decision Making Process as a Technique for Redistributing Outdoor Recreation Use*. Master's Thesis. Utah State University, Logan, Utah.
- Hall. 1982. *The Hiker's Guide to Utah*. Falcon Press Publishing Company, Inc., Billings and Helena, Montana.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Interagency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates. 1977. "Visual Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah" (unpublished document) Cambirdge Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.

SIDS MOUNTAIN WSA

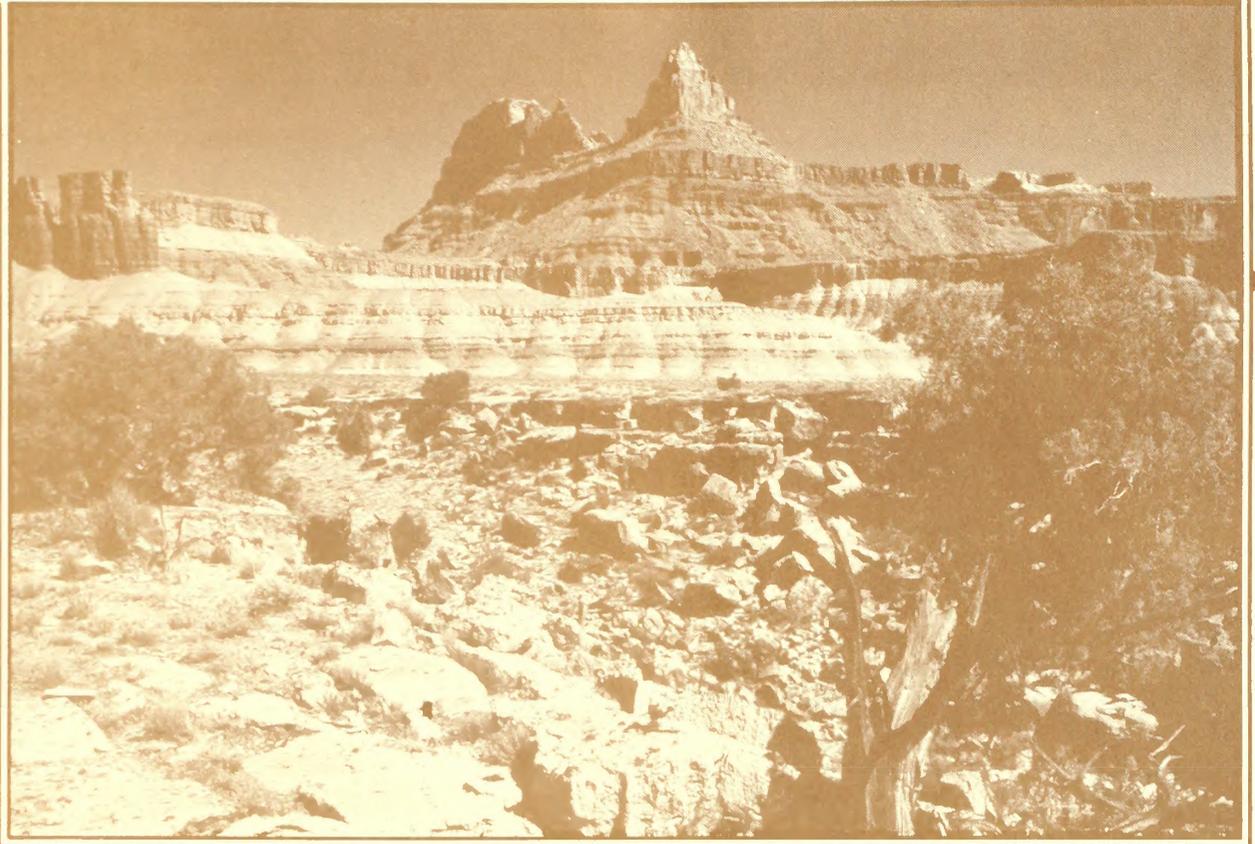
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984c. *Utah Combined Hydrocarbon Leasing Land Use Plan Amendments and New Lease Tracts Record of Decision*. October 1984. Utah State Office, Salt Lake City, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington D.C.
- U.S. Department of the Interior, Geological Survey 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January 1982. U.S. Government Printing Office, Washington D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Recreation Plan, 1980 SCORP*, Salt Lake City, Utah.

SIDS MOUNTAIN WSA

Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely

Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington, D.C.

Mexican Mountain WSA



MEXICAN MOUNTAIN WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	1
Alternatives Considered and Eliminated from Detailed Study	1
Alternatives Analyzed	1
No Action Alternative	2
All Wilderness Alternative	2
Partial Wilderness Alternative (Proposed Action)	6
Summary of Environmental Consequences	12
AFFECTED ENVIRONMENT	12
Air Quality	12
Geology	12
Soils	16
Vegetation	17
Water Resources	17
Mineral and Energy Resources	18
Wildlife	21
Forest Resources	22
Livestock and Wild Horses/Burros	22
Visual Resources	22
Cultural Resources	23
Recreation	24
Wilderness Values	25
Land Use Plans and Controls	27
Socioeconomics	27
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	29
Analysis Assumptions and Guidelines for All Alternatives	29
No Action Alternative	29
All Wilderness Alternative	34
Partial Wilderness Alternative (Proposed Action)	34
BIBLIOGRAPHY	45

MEXICAN MOUNTAIN WSA

(UT-060-054)

INTRODUCTION

General Description of the Area

Mexican Mountain Wilderness Study Area (WSA) is in the east-central San Rafael Swell region in Emery County, Utah. It is between the base of the San Rafael Reef on the east and the Buckhorn Draw road on the west, between Box and Jackass Flats south of Cedar Mountain and the Jackass Benches north of Interstate 70 (I-70). The San Rafael River winds for about 34 miles through the WSA. The WSA is about 15 miles long east to west and varies generally from 4 to 10 miles wide north to south. The nearest community is Green River, about 18 road miles to the east on I-70.

The WSA contains approximately 59,600 acres of BLM-administered land. It was originally reported as having 60,360 acres; the difference in acreage is attributable to Master Title Plat checks.

The WSA is characterized by unusual surface geologic features resulting from erosion of the colorful, sedimentary rocks across the structure of the east San Rafael Swell. Formations of the WSA are those between the Entrada and Cocomino Sandstones representing nearly all of the formations in the central part of the San Rafael Swell. Surface features include the rock slopes of the Reef, the vertical-walled black cliffs, the buttes, cuernas, alcoves, and pinnacles along the canyons of the WSA, and the rock dunes between the Reef and the rims above the river. Elevations in the WSA range from 4,700 to 6,900 feet.

Climate of the WSA is arid to semiarid. Average annual precipitation is 6 to 12 inches falling mainly during thunderstorms. Annual evapotranspiration greatly exceeds annual precipitation. Winter snowfall is light, totaling 8 to 10 inches. Temperatures can range between 8 and 102 degrees Fahrenheit (F).

The Mexican Mountain WSA is one of two WSAs north of I-70 that form an irregular half circle in the northern part of the San Rafael Swell. The Sids Mountain WSA is the other unit and is located immediately to the west.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the San Rafael and Price River Resource Areas are discussed in Volume I. Three specific issues pertaining to the Mexican Mountain WSA were identified through public scoping (USDI, BLM, 1984b) and are responded to below:

1. *Comment:* The occurrence of the sensitive plant species *Cryptantha johnstonii*, *Psoralea polyadenius* var. *jonesii* and *Hymenoxys depressa* in or near this WSA should be considered in the decisionmaking process.

Response: *Cryptantha johnstonii* is no longer a Fish and Wildlife Service (FWS) candidate species. There are eight sensitive plant species that may be found in or near the WSA. These include the endangered *Sclerocactus wrightiae* and *Erigeron maguirei*. These sensitive species have been analyzed under each alternative. Because of mitigation required under existing law, regulation, and BLM policy, sensitive plant species would generally be protected from disturbance and loss.

2. *Comment:* Wilderness designation would protect San Rafael River, which is a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic Rivers System.

Response: As analyzed in the Environmental Consequences of Alternatives section, wilderness designation would provide an element of protection to the San Rafael River and recreational opportunities found there.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (59,600 acres); and (3) Partial Wilderness (46,750 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management



MEXICAN MOUNTAIN WSA

projections for each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE

With this alternative, none of the 59,600-acre Mexican Mountain WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the San Rafael and Price River Management Framework Plans (MFPs) (USDI, BLM, 1979a and 1983). That portion of the WSA administered under the San Rafael MFP (the southwest part of the WSA including most of the river corridor) has been identified in the plan to be studied as an Outstanding Natural Area (ONA) or as an Area of Critical Environmental Concern (ACEC). Under the Price River MFP, inventory and documentation for the segment of the Old Spanish Trail through the San Rafael Reef would be completed. Management decisions for these special designations would be implemented through normal BLM planning and procedures; therefore, they are not considered further here and it is assumed for analysis purposes in this document that no special designations would occur with this alternative. The State land within the WSA (refer to Map 1) has not been identified in the MFPs for special Federal acquisition through exchange or purchase. Refer to Volume I for further information on State in-holdings.

The following are specific actions that would take place under this alternative:

- All 59,600 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on 176 existing mining claims (2,350 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without concern for wilderness values. Existing oil and gas leases (35,272 acres) and future leases could be developed under leasing Category 1 (standard stipulations) on 22,510 acres; Category 2 (special stipulations) on 7,280 acres; and Category 3 (no surface occupancy) on 9,010 acres. Some 20,800 acres would remain in Category 4 (no leasing) and continue to be unavailable for leasing. About 28,664 acres of the San Rafael Swell Special Tar Sand Area (STSA) overlaps the Mexican Mountain WSA. None of the acreage in the WSA is involved in a lease conversion process that would provide for tar sand development. Should future tar sand development

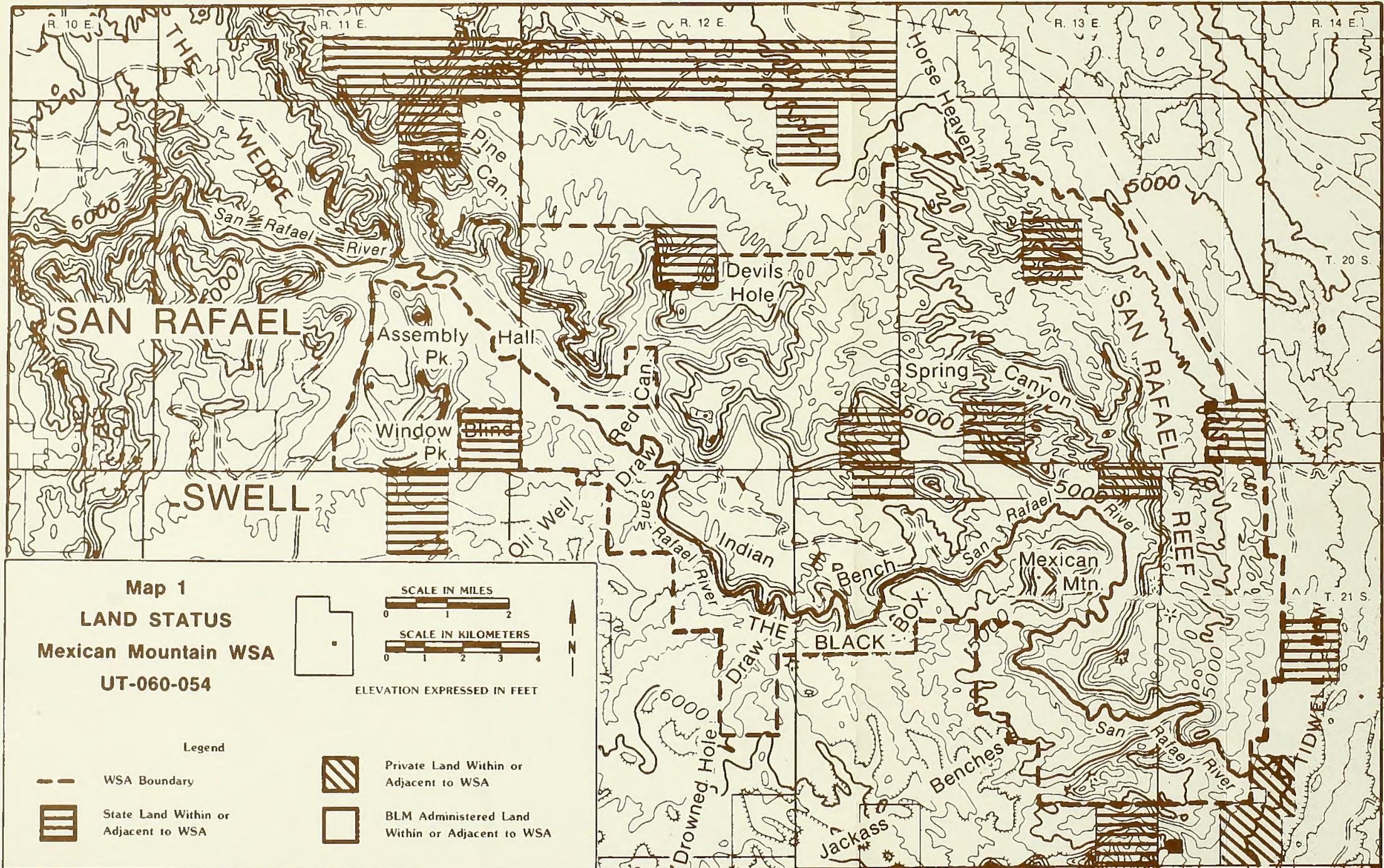
(competitive leasing) occur under this alternative it would be guided by the leasing categories established by the two MFPs.

- The present domestic livestock grazing use in the WSA would continue as authorized in the MFPs (currently 1,809 Animal Unit Months [AUMs]). Existing developments (including two reservoirs and two short allotment boundary fences) could be used and maintained. New rangeland developments could be implemented without wilderness consideration. No developments are currently proposed for use by livestock.
- Developments for wildlife, water resources, etc. could be allowed if in conformance with the MFPs. The development of up to five springs and one catchment for bighorn sheep is proposed.
- Off-road vehicle (ORV) use in the 30,600 acres of the WSA in the Price River MFP area would be limited to existing roads and trails but new access routes for development could be allowed. ORV use in the 29,000 acres of the WSA in the San Rafael MFP area would remain open to ORV use.
- The entire 59,600-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (55,000 acres) and Class III (4,600 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

With this alternative, all 59,600 acres of the

MEXICAN MOUNTAIN WSA



MEXICAN MOUNTAIN WSA

Mexican Mountain WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, exchange of five sections of State land (2,607.8 acres) within the WSA and three sections of State land (1,920 acres) adjacent to the WSA (refer to Map 1) would be likely, as requested by the State. (Refer to Volume I for further information regarding State in-holdings.) Five other State sections adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 59,600 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately 2,350 acres of 176 existing mining claims that may be determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases involving 35,272 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown prior to wilderness designation. No leasing of the tar sand resource in the WSA would be allowed; therefore, tar sand exploration or development would not occur.
- Present domestic livestock grazing would continue as authorized in the Price River and San Rafael MFPs. The 1,809 AUMs in the WSA would remain available to livestock as presently allotted. The use and maintenance of rangeland improvements (two short allotment boundary fences and two reservoirs) existing at the time of designation would continue in the same manner as in the past based on practical necessity and reasonableness. It is assumed that, after designation, new rangeland improvements (none are now planned) would be allowed if necessary for the protection or effective management of the rangeland and/or wilderness resource and if it can be carried out consistent with wilderness protection standards (refer to Appendix 1).
- New water resource facilities or watershed activities (not related to rangeland or wildlife management) would be allowed after designation only if compatible with wilderness values, if necessary to correct an imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). No water resource facilities or watershed treatments are located in the Mexican Mountain WSA and, although two dam sites have been identified on the San Rafael River, no projects are planned. It is assumed that future claims on the river in the WSA would not be allowed.
- Wildlife transplants or developments would be allowed after designation if compatible with wilderness values. The development of up to five springs and one catchment for bighorn sheep is planned. Reintroduction of native species to augment present populations would be considered if proposed by the Utah Division of Wildlife Resources (UDWR).
- The entire 59,600-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved rangeland developments. About 20 miles of existing ways and four-wheel drive trails would not be available for vehicular use except as indicated above. The approximately 1 mile of dirt road that borders the WSA and approximately 9 miles of "cherry-stemmed" county road to the Black Box would remain open to vehicular use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 59,600-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to or "cherry-stemmed" into the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

MEXICAN MOUNTAIN WSA

- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. It is assumed that firefighting would be limited to hand and aerial methods.
- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

With this alternative, 46,750 acres of the Mexican Mountain WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the

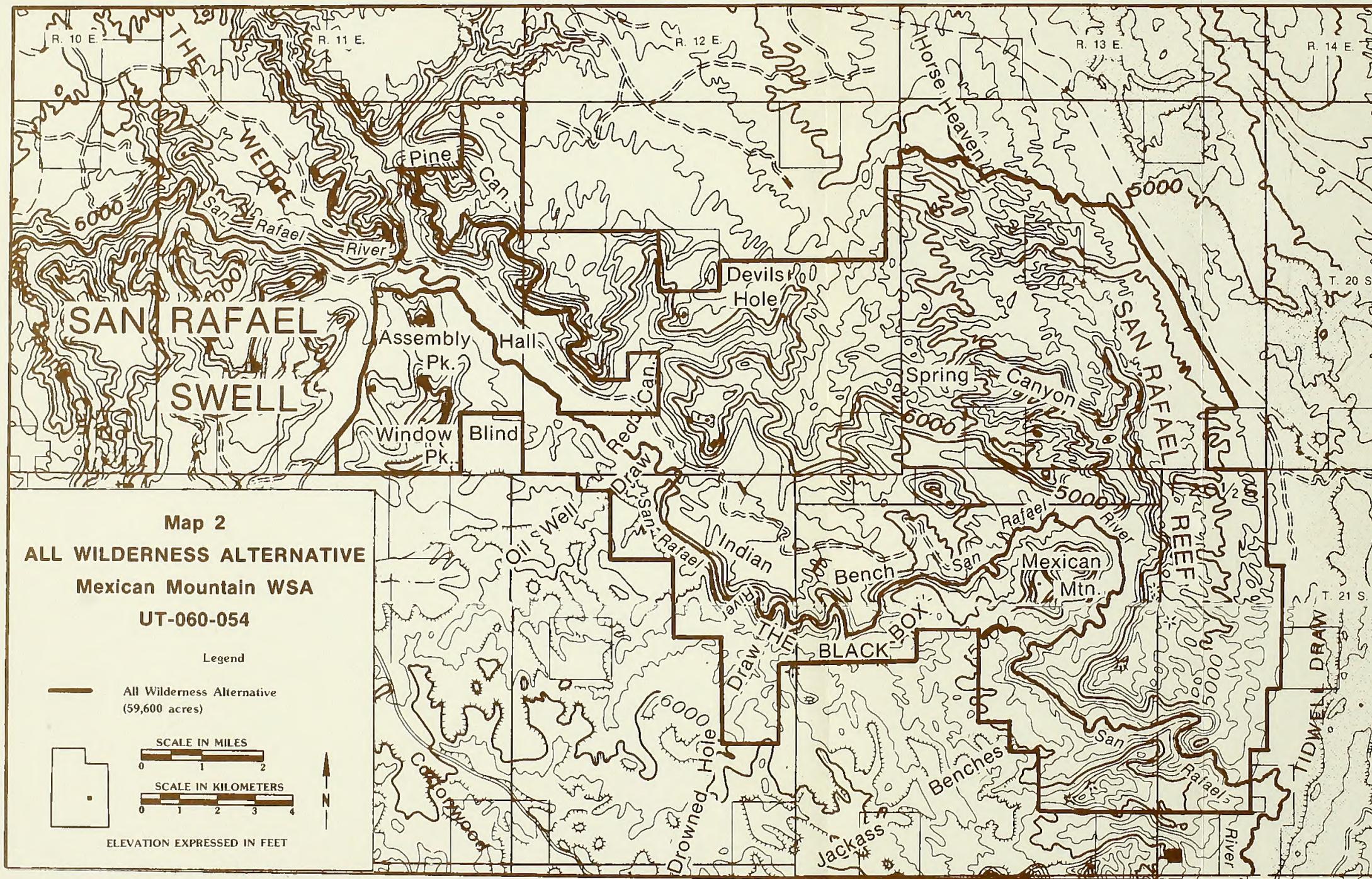
WSA with the most outstanding wilderness characteristics and to eliminate conflicts with popular ORV and campsite use areas. About 12,850 acres in the WSA not considered for wilderness designation with this alternative would be managed in accordance with the Price River and San Rafael MFPs, as described for the No Action Alternative. The 46,750-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative.

On designation, acquisition of five State sections within the wilderness area and three State sections adjacent to the area would be likely, as requested by the State. Four other State sections adjacent to the WSA probably would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts would be the same as those on adjacent Federal lands, and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. (Refer to Volume I for further information regarding State in-holdings.)

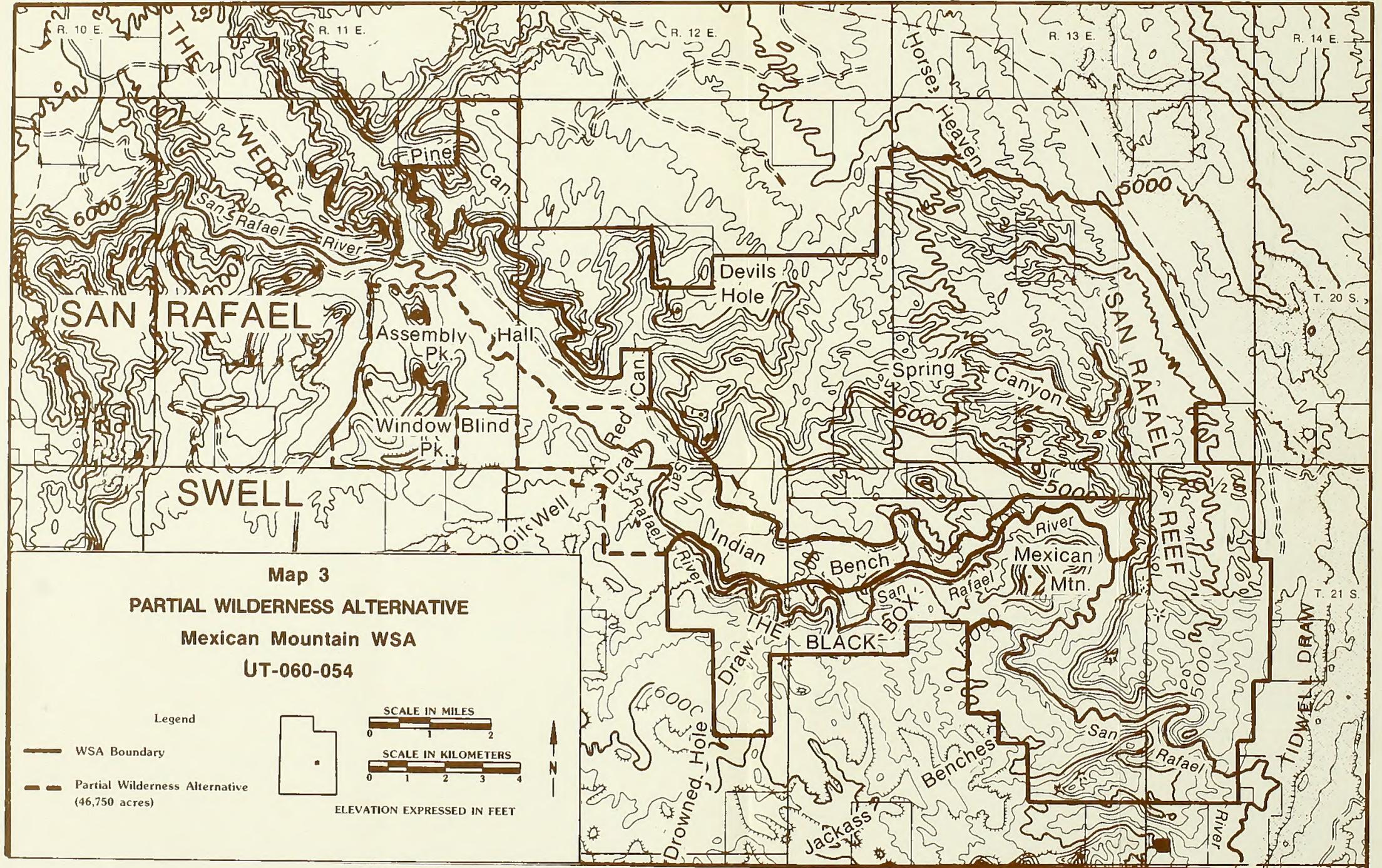
A summary of specific actions under this alternative follows.

- The 46,750-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and mineral sale. However, development work, extraction, and patenting would be allowed to continue on 910 acres of existing mining claims, provided that they are valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases covering 25,400 acres (as of March 1983) would be phased out upon expiration unless a find in commercial quantities is shown. The 12,850-acre area not designated wilderness would be open to mineral location, leasing, and sale without concern for wilderness values and in accordance with the MFPs. Development work, extraction, and patenting of existing mining claims (1,440 acres) and future mining claims could occur if the claims are valid. Development of existing oil and gas leases (9,872 acres) and future leases could also occur. The area not designated wilderness would be managed as oil and gas leasing Category 1 (standard stipulations) on 9,770 acres; Category 2 (special stipulations) on 1,110 acres, and Category 3 (no surface occupancy) on 900 acres. Some 1,070 acres would be in Category 4 (no leasing) and

MEXICAN MOUNTAIN WSA



MEXICAN MOUNTAIN WSA



Map 3
PARTIAL WILDERNESS ALTERNATIVE
Mexican Mountain WSA
UT-060-054

Legend

- WSA Boundary
- - - Partial Wilderness Alternative (46,750 acres)

SCALE IN MILES
 0 1 2

SCALE IN KILOMETERS
 0 1 2 3 4

ELEVATION EXPRESSED IN FEET

N

MEXICAN MOUNTAIN WSA

would continue to be unavailable for leasing. Tar sand development would not be allowed in the wilderness area. In the non-wilderness area, tar sand could be developed through a competitive leasing program.

- Domestic livestock grazing would continue as authorized in the Price River and San Rafael MFPs. The 1,123 AUMs in the wilderness area would remain available to livestock as presently allotted. In the wilderness area, two short allotment boundary fences and one reservoir could continue to be used and maintained in the same manner as in the past, based on practical necessity and reasonableness. Rangeland developments would be allowed after designation only if necessary for the protection and effective management of the rangeland and/or wilderness resources, and if wilderness protection criteria are met. In the 12,850-acre nonwilderness area, grazing use of 686 AUMs and use of one reservoir also would continue as authorized in the MFPs. Although none are presently proposed, future livestock facilities could be added without wilderness considerations.
- In the 46,750-acre wilderness new water resource facilities or watershed activities (other than rangeland developments) would be allowed only if compatible with wilderness, needed to correct imminent hazards to life and property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. It is assumed that future dams on the San Rafael River in the 46,750-acre wilderness would not be allowed. In the 12,850-acre nonwilderness area, water resource developments would be allowed if in accordance with the MFPs. None are now planned.
- In the 46,750-acre wilderness area, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the 12,850-acre nonwilderness area, wildlife transplants or improvements would be allowed if in accordance with the MFPs without consideration for wilderness values.
- The 46,750-acre wilderness area would be closed to ORV use. In the portion of the WSA not designated as wilderness ORV use would be limited to existing roads and trails in the 2,600-acre area administered in accordance with the Price River MFP and would remain open to ORV use in the 10,250-acre area administered with the San Rafael MFP. About 10 miles of existing vehicular ways within the wilderness portion would no longer be available for vehicular use except for purposes identified under the All Wilderness Alternative. No roads would be "cherry-stemmed," as the existing road to the Black Box would be outside of that part of the WSA designated as wilderness.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 46,750-acre wilderness area. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the wilderness area would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The 12,850 acres not designated wilderness would be open to woodland harvest.
- Visual resources in the wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The 12,850 acres not designated as wilderness would be managed as Classes II and III as currently set forth in the Price River and San Rafael MFPs.
- Within the wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. It is assumed that firefighting would be by hand or aerial means. In the area not designated, measures of control would be taken without wilderness considerations.
- In the nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the wilderness such activity would be allowed by permit if compatible with wilderness preservation. It would be limited to that conducted without use of

motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.

- In the nonwilderness area hunting would be allowed subject to applicable State and Federal laws and regulations. In the wilderness area, use would be allowed subject to applicable laws and regulations but would be limited to nonmotorized means.
- In the nonwilderness area, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 46,750-acre wilderness, control of predators would be allowed for the same purposes, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental impacts that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the San Rafael MFP (USDI, BLM, 1979a), Price River MFP (USDI, BLM, 1983), BLM file material, and knowledge of resource specialists.

Air Quality

The WSA is in a Prevention of Significant Deterioration (PSD) Class II air quality retention area designation (1977 Clean Air Act, as amended). The nearest Class I areas are Canyonlands and Arches National Parks, about 40 miles to the southeast of the WSA.

Potential pollution sources include industrial and vehicular emissions from Castle Valley and the Green River areas. A large point source includes two powerplants in Castle Valley. Fugitive dust from vehicle use is the most significant pollutant to the WSA at this time. Fugitive dust is intermittent depending mainly on localized activities and

wind patterns. Visibility from promontories in the WSA usually is good, ranging from 30 to 100 miles, although hazy conditions on occasion affect views to the north and west.

Geology

The Mexican Mountain WSA is located on a large anticline (uplift) called the San Rafael Swell. Due to the uplift and subsequent erosion, the Swell has been breached with resulting exposure of sedimentary rock (strata) ranging in age from the Pennsylvanian to the Tertiary period. The WSA itself includes strata exposures ranging from the Pennsylvanian to early Cretaceous period. The exposures represent approximately 5,200 feet of sedimentary strata exposed on the east flanks of the Swell. The WSA includes less than 2 percent of the whole uplift, but it includes some of the most scenic and remote areas of the uplift.

All drainages in the WSA are directly or indirectly tributary to the San Rafael River. The river flows from the northwest to the southeast diagonally across the structure of the Swell without apparent regard to the presence of dipping strata resistant to erosion. This has occurred because the slow rate at which the Swell was uplifted allowed the preexisting drainage pattern to become etched across the structure.

Variation in resistance to erosion and dipping of strata has caused a wide variety of topographic features to form, including cliffs, gorges, canyons, large erosional remnants, cuestas, and plateaus. These topographic features allow the WSA to be divided into six major topographic areas; namely, (1) the San Rafael Reef and dip slopes of the Navajo Sandstone; (2) the cliff line north of the San Rafael River and canyons extending into the cliff; (3) large erosional remnants present as mountains and peaks along and south of the river; (4) the gorges of the San Rafael River known as the Black Box and the Lower Black Box; (5) the canyon cut by the river through the San Rafael Reef; and (6) low relief country south of the river which includes pediments, plateaus, and cuestas.

The northeastern and eastern portions of the WSA are characterized by surface exposures of the Navajo Sandstone that have been eroded into massive tan, white, and orange petrified sand dunes or buttes. Exposures of the Navajo Sandstone cover approximately 25 percent of the WSA. Near the eastern boundary of the WSA, the Navajo Sandstone plunges into the subsurface. Toward the southeastern end of the WSA, the strata plunges more sharply to dip down at nearly

MEXICAN MOUNTAIN WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MEXICAN MOUNTAIN WSA**

Resource	Alternatives		
	No Action	All Wilderness (59,600 Acres)	Partial Wilderness Designation (46,750 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 30 to 40 million barrels of oil from tar sand, 750,000 tons of potash, 500 to 1,000 tons of uranium oxide, and 50,000 tons of copper. Low temperature geothermal energy and hydroelectric power could also be developed.	Oil, gas, tar sand, and potash likely would not be recovered, and geothermal and hydroelectric energy would not be developed. Assuming a worst-case analysis, uranium and copper recovery would also be foregone. Due to the low likelihood of recovery of these mineral and energy resources, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 2 million barrels of oil, 8 million barrels of oil from tar sand, 150,000 tons of potash, 300 to 600 tons of uranium oxide, and 30,000 tons of copper could be recovered.
Wildlife	About 3 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Wildlife would benefit from development of six springs.	Wildlife would benefit from solitude.	Wildlife in the designated area would benefit from solitude. About 0.4 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 1,809 AUMs and maintenance of existing developments would continue. New developments could be implemented; however, none are now proposed.	Grazing of 1,809 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 1,760 acres.	Visual quality could be impaired on up to 70 acres.	Visual quality could be impaired on 250 acres, including 50 acres in the designated portion. About 85 percent of the Class A scenery would be within the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 20 miles of ways. Overall recreational use could increase from the present 1,500 visitor days per year to 2,235 over the next 20 years. Up to 1,760 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 20 miles of ways, would be closed to ORV use. Recreational use could increase to up to 8,940 visitor days per year over the next 20 years due to publicity associated with wilderness designation.	ORV recreational use could continue on 10 miles of ways in the undesignated portion. Overall recreational use could increase to up to 7,930 visitor days over the next 20 years.

MEXICAN MOUNTAIN WSA

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
MEXICAN MOUNTAIN WSA

Resource	Alternatives		
	No Action	All Wilderness (59,600 Acres)	Partial Wilderness Designation (46,750 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 1,760 acres (almost 3 percent of the WSA).	Wilderness values would be protected, except on up to 70 acres (0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 50 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on 1.6 percent of the 12,850 acres not designated. Overall, wilderness values could be lost on 0.4 percent of the WSA. However, 78 percent of the area meeting the standards for naturalness and the standards for outstanding opportunities for primitive recreation, and 87 percent of the area meeting the standards for outstanding opportunities for solitude would be in the designated portion, and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> and the current BLM San Rafael and Price River MFPs. It would be consistent with State of Utah plans and policies, except for those regarding peregrine falcon and desert bighorn sheep. The option of National Park status for the WSA would be open, but development allowed with the No Action Alternative could reduce the potential of the area for National Park status.	This alternative would not be consistent with Emery County's policies. It would be consistent with State policy if lands were exchanged. Designation would constitute amendments of the BLM San Rafael and Price River MFPs. The option for National Park status would remain following wilderness designation.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Emery County's zoning.
Socio-economics	Annual local sales of less than \$59,930 and Federal revenues of up to \$108,349 would continue. An additional \$10,584 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of up to \$59,930 and Federal revenues of up to \$2,533 would continue, but Federal revenues of up to \$116,400 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, but increased recreational use over the next 20 years could result in local benefits of up to \$36,654 per year.	The effects of Partial Wilderness Designation would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$81,060. Local sales from recreational uses of up to \$32,513 could result from increased recreational use over the next 20 years.

MEXICAN MOUNTAIN WSA

vertical angles. The steeply dipping Navajo Sandstone and associated strata are referred to as the San Rafael Reef.

Stratigraphically above and to the east of the Navajo Sandstone is the red-brown to gray Carmel Formation composed of less resistant siltstones, sandstones, limestones, and gypsum beds. In the San Rafael Reef at the south of the WSA the Carmel Formation occurs as flatirons, triangular-shaped outcrops against the dip slope. These flatirons become more extensive and intricately eroded to the north to the degree that the typical triangular shape disappears. These flatiron-type Carmel deposits cover about 7 percent of the WSA. The Carmel Formation grades into the overlying massive red-brown sandstones of the Entrada Formation.

Cottonwood Draw is the major drainage cutting the San Rafael Reef in the north part of the WSA. Cottonwood Draw, with its tributary canyons, extends about 7 miles from its headwaters to the Reef, draining an area of about 6,000 acres of the WSA. The other drainages along the east side of the WSA extend 1 to 2 miles into the Reef as canyons cutting through the Entrada and Carmel and into the Navajo. All of the canyons are steep-walled and narrow. Overall elevation change in this topographic unit is 2,200 feet.

A 1,000-foot cliff parallels the San Rafael River to its north for about 20 miles, separating the river from the dip slopes of the Reef to the north and northeast. The cliff is composed of Moenkopi, Chinle, Wingate, Kayenta, and Navajo Sandstones in ascending order. The Moenkopi Formation is composed in descending order of (1) alternating red-brown shales and mudstones; (2) a red-brown limestone and sandstone bed (Sinbad Member); (3) thick yellow to gray shales; and (4) brown to gray, fine-grained sandstone in thin beds alternating with shale. The Moss Back and Church Rock Members of the Chinle Formation are above the Moenkopi. At its base, the Chinle consists of yellowish-gray to greenish-gray interbedded conglomerate, sandstone, and siltstone of the Moss Back Member. The overlying Church Rock Member is characterized mainly by red siltstones and sandstones, gray conglomerate, buff sandstones, and red, purple, and green claystone. The Wingate Sandstone is a massive, light-orange to tan sandstone with large-scale cross-bedding marked by vertical joints. The sandstone is medium-grained and in places interbeds of shale or shale conglomerate or lenses of cherty limestone are present. The Kayenta Formation above the Wingate is composed primarily of red sandstone with some green

siltstone and limestone-siltstone-pebble conglomerate. The cliff is capped by the Navajo Sandstone which also makes up most of the dip slopes of the San Rafael Reef.

The major canyons north of this cliff display the same formations in their walls. Cuestas, buttes, pinnacles, and alcoves are common in these canyons. There is a prominent arch in Spring Canyon. The canyon bottoms are wider close to the San Rafael River, becoming more narrow and steep toward the headwaters, particularly as they rise through the Wingate and Navajo Formations. In all, about 25 miles of canyons are cut between the major cliff and dip slopes of the San Rafael Reef, ranging in depth from 200 to 1,200 feet.

Window Blind Peak, Assembly Hall Peak, Mexican Mountain, and an unnamed peak northwest of Mexican Mountain are major erosional remnants along the San Rafael River covering 600 to 2,000 acres each. They are all similar to the cliff north of the San Rafael River in elevational change (about 1,000 feet) and composing strata. Mexican Mountain, for which the WSA is named, covers about 2,000 acres and is skirted at its base by the Mexican Bend of the San Rafael River.

The Black Box (also known as the Lockhart Box) and Lower Black Box are narrow, nearly vertical-walled, meandering canyons cut by the San Rafael River through Kaibab Limestone and Coconino (or White Rim) Sandstone. The Black Box is west of Mexican Bend and the Lower Black Box is south of Mexican Bend. The Kaibab Limestone along the rims is light gray and locally sandy with some quartz, frequent fossils sometimes found in beds, and chert geodes with quartz and calcite crystals. Pyrite and mica are notable in the lower layers of the Kaibab Limestone as it grades to a sand-and-shale layer at its base. The two 200-foot deep Black Boxes are cut primarily through Coconino Sandstone. The sandstone is massive and lime cemented with large-scale cross-beds of feldspar and mica grains. The overall coloration is a mix of pink, black, and white.

The canyon of the San Rafael River in the southeastern portion of the WSA passes through all the formations found in both the major cliff line and those found in the dip slopes of the Reef. The canyon is about 4.5 miles long and about 100 to 300 yards wide at the canyon floor. It ranges in depth from 300 to 1,200 feet. Tributary canyons along this section of river are short, ranging from .5 to 3 miles, and steep. There is one abandoned meander forming the rincon at Thompson Hole near the WSA boundary.

MEXICAN MOUNTAIN WSA

The remainder of the WSA along Jackass Benches and to the southwest of the WSA is a relatively low relief terrain with pediments, plateaus, and cuestas formed from the Moenkopi Formation.

Soils

As shown on Table 2, about 60 percent of the WSA is rock outcrop or rubble land. About 35 percent of the WSA consists of shallow, loamy soils which, for the most part, are intermixed with rock outcrops. The remainder, about 5 percent, are deep soils along river channels and washes, where wind-blown sand and silt have accumulated at the base of alluvial fans. Soil losses from erosion are very low and average less than 0.35 cubic yards/acre/year, except (1) during severe thunderstorms when the San Rafael drainage is naturally supplied with sediments from exposed rock and soil; and (2) in areas where vegetation is removed and wind erosion becomes more significant. Most erosion is naturally caused except in the most highly used ORV areas around the San Rafael Campground. Erosion rates due to surface disturbance would be expected to be low, largely due to the coarse character of the soils. Soils more susceptible to erosion cover about 4 percent of the WSA. An average soil erosion rate for disturbed soils in the WSA would be about 1.8 cubic yards/acre/year.

Although erosion potential is low it is noted that, due to the steep terrain and rocky characteristics, expected success for revegetation would be poor to very poor, except in the more productive deep soils covering about 5 percent of the WSA. Table 3 indicates soil erosion for the WSA.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop and rubble land	60	35,760	0.0	0
Shallow loamy soils on sloping structural benches and ledges	35	20,860	1.0	5
Very deep loamy and sandy soils along stream channels and gently sloping canyon bottoms	5	2,980	0.1	1
Totals	100	59,600		

Source: Hansen, 1985.

Table 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	0
High	10.0	0	0	0	0	0	0
Medium	5.0	0	0	0	35	20,860	104,300
Low	1.0	35	20,860	20,860	5	2,980	2,980
Very Low	0.1	5	2,980	298	0	0	0
None	0.0	60	35,760	0	60	35,760	0
Totals		100	59,600	21,158	100	59,600	1107,280

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.35 under present conditions; 1.8 if disturbed.

MEXICAN MOUNTAIN WSA

Vegetation

Predominant vegetation types in the Mexican Mountain WSA are low producing desert and semidesert communities, with the exception of those in riparian areas. Table 4 indicates existing vegetation types of the WSA.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Barren	28,050	47
Juniper-pinyon	19,920	34
Shadscale	6,820	11
Semidesert shrub	2,310	4
Semidesert grass	1,180	2
Riparian	1,320	2

Source: USDI, BLM, 1979a and 1982c.

The barren type is low in production with only occasional scattered vegetation. Common plants include Utah juniper, pinyon pine, and little leaf mountain mahogany. Sparse understory plants include green rabbitbrush, pepperweed, western wheatgrass, galleta, bullgrass, and Indian ricegrass.

The juniper-pinyon type is found in relatively flat locations with shallow soil. Utah juniper and pinyon pine clearly dominate, with understory of shadscale, Mormon tea, squawbush, black sagebrush, snakeweed, prickly pear cactus, globemallow, slender gilia, and eriogonum.

The shadscale type is low growing and occurs at lower elevations with low rainfall. Dominant plants are shadscale, Mormon tea, and galleta. Associated with them are snakeweed, desert trumpet, slender gilia, desert plantain, globemallow, and Indian ricegrass.

The semidesert shrub and semidesert grass are fairly productive types occurring in deeper soils. Major species in the shrub-dominated type are black sagebrush, Mormon tea, rabbitbrush, shadscale, snakeweed, and galleta. Other common plants are Indian ricegrass, needle and thread, blue grama, globemallow, aster, and cryptantha. The major species in the grass-dominated type is blue grama or Indian ricegrass. Russian thistle dominates when conditions are poor. Other associated species in the grass type are needle-and-thread, sand dropseed, ragweed, phacelia, white stem blazing star, four-wing saltbush, and winterfat.

The riparian type occurs only in canyons where water is available. Dominant vegetation includes tamarisk, smotherweed, common reed, and scratch-grass. Cottonwood, willow, and rush are common where conditions are good. Dryer areas with high water tables are dominated by rubber rabbitbrush, squawbush, and saltgrass. Other common species include greasewood, alkali sakaton, Douglas rabbitbrush, seepweed, and big sagebrush.

Two Federally listed endangered plant species have been found in the Mexican Mountain WSA. They are *Sclerocactus wrightiae* (endangered) and *Erigeron maguirei* (endangered). *Sclerocactus wrightiae* may be found anywhere in the WSA, with eight other sites known outside the WSA. *Erigeron maguirei* grows in dry rocky canyon bottoms in desert shrub communities. The surface formation is generally Navajo Sandstone, and this plant is only known to occur in the vicinity of Buckhorn Draw and one other location in Utah. The WSA includes 400 acres of habitat for this plant. Six candidate or proposed plant species could potentially be found in the WSA. They include *Cycladenia humilis* var. *jonesii* (proposed endangered), and five candidate species (*Hymenoxys depressa*, *Pediocactus despainii*, *Psoralea polyadenius* var. *jonesii*, *Schoenocrambe barenbyi*, and *Sphaeralcea psoraloides*).

The Mexican Mountain WSA is in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types in the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	35,760	60
Saltbush-greasewood	23,840	40
Total	59,600	100

Source: USDI, Geological Survey 1978.

Water Resources

The San Rafael River is the primary perennial water source, flowing about 34 miles through the

MEXICAN MOUNTAIN WSA

WSA. Of the 23 springs and water holes in the WSA, a number are also perennial, while others are intermittent. Drainages of the WSA are all tributary to the San Rafael River, either directly or by way of Tidwell Draw. Consumptive water use in the WSA, at this time, is primarily by livestock and wildlife. Nonconsumptive uses include seasonal floatboating, tubing, and a limited fish habitat.

Salinity in the river is high due to upstream irrigation and surface geology of the drainage. Dissolved solids may reach as high as 2,500 milligrams per liter (mg/l). The water could be safe for human consumption if it is settled and treated. There are two developed reservoirs for livestock in the WSA adjacent to the San Rafael River road.

Mineral and Energy Resources

The BLM, in consultation with the U.S. Department of Energy, had each WSA within Utah independently assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system.

An overall importance rating (OIR) of 3- was assigned to the Mexican Mountain WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR is based primarily on the favorable rating for tar sand, uranium, and the hydropower siting opportunity. The energy and mineral summary is given in Table 6.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1 ³	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f3	c4	10 to 500 million barrels in-place
Coal	f1	c4	None
Geothermal	f2	c2	Low temperature
Hydropower	f3	c4	Small scale (less than 15 megawatts)
Uranium/ Vanadium	f3	c4	500 to 1,000 tons of oxide
Copper	f2	c2	Less than 50,000 tons
Manganese	f2	c1	100,000 tons of 40-percent manganese
Potash	f2	c2	Less than 1 million tons

Source: SAI, 1982⁴.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

³Information available to the BLM suggests that the certainty rating for the WSA should be c2.

⁴SAI did not rate gypsum and sulphur; however, BLM has added additional information in the document.

and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA contains deposits of vanadium and could contain copper and manganese, currently listed as strategic and critical materials (Federal Emergency Management Agency, 1984). Although listed as strategic, copper is relatively common and supplies currently exceed domestic demand.

LEASABLE MINERALS

There are no existing mineral leases in the WSA other than oil and gas. Other leasable minerals produced regionally include potash and coal. Tar sand could become a production interest and could be leased in a combined hydrocarbon lease that would also include oil and gas.

Oil and Gas

The low rating for oil and gas indicates a potential for accumulations of less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas (a small deposit) as scattered occurrences. An estimated less than 3 million barrels of oil or less than 18 billion cubic feet of gas are considered recoverable. While the potential of some rock units around the San Rafael Swell may be

MEXICAN MOUNTAIN WSA

high, widespread fracturing and rupturing of potential reservoirs is thought to have reduced potential. Fracturing is believed to have allowed petroleum to move vertically into the Moenkopi Formation yielding tar sand.

Producible oil and gas are found only where a number of essential conditions exist, namely a petroleum source, porous and permeable rock, and a trap. Within the WSA, petroleum in the Moenkopi Formation is evidenced by the outcrop of tar sand. The Moenkopi is below the surface in about 40 percent of the WSA, northeast of the major cliff line. The northern and eastern boundaries of the WSA are from 0 to 5 miles distance from the outcrop. The Grassy Trail Field, a small field 25 miles north of the WSA, has produced over 130,000 barrels of oil from this formation. Limiting factors to production from the Moenkopi are poor porosity and small reservoir size. Evidence of possible combined structural/stratigraphic traps similar to those of the Grassy Trail Field exist for the vicinity of the Mexican Mountain WSA. Potential depends on the relative permeability of the Moenkopi below the surface in the WSA and surrounding the Mexican Mountain WSA. Where petroleum has migrated to the surface, tar sand was formed. It is uncertain how much petroleum remains below the surface of the WSA, trapped as oil. Petroleum potential would increase with distance from the outcrop. Overall potential for the Moenkopi in the WSA is considered low due to shallow overburden and proximity to the outcrop. Potential for the Moenkopi Formation would improve to the north of the WSA as distance from the outcrop increases. Any potential for areas near the outcrop is probably associated with tar sand rather than with conventional oil and gas.

The only other formation having any significant potential for oil and gas is the Paradox Formation, as much as 9,000 feet below the surface. Complex stratification and later uplift provides for potential traps. Potential for this formation is not well defined.

Lease categories for much of the southeast portion of the WSA are presently either no lease or no surface occupancy, based upon natural, scenic and primitive recreation values. Leasing categories are shown in Table 7. These apply to oil, gas, and in some parts of the WSA, to tar sand.

Approximately 35,272 acres or 59 percent of the WSA is under oil and gas lease. No leases in the WSA are under production or held by established production.

TABLE 7
Oil and Gas Leasing Categories

Category	Acres	Percent of WSA
1. Open	22,510	38
2. Open with special stipulations	7,280	12
3. Open with no surface occupancy	9,010	15
4. Closed to leasing	20,800	35
Total	59,600	100

Source: USDI, BLM, 1975.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases. There are 80 acres of pre-FLPMA leases and 35,192 acres of post-FLPMA oil and gas leases in the Mexican Mountain WSA.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Tar Sand

The moderate favorability rating for tar sand (oil-impregnated rock) is assigned for deposits ranging between 10 and 500 million barrels of in-place oil. Tar sand is present where the Moenkopi Formation (primarily the Torrey Member) is at or near the surface. The San Rafael Swell STSA overlaps 28,664 acres or 48 percent of the WSA. Total estimated potential reserves for the entire

MEXICAN MOUNTAIN WSA

115,705 acres of the San Rafael Swell STSA are 445 to 545 million barrels of oil (USDI, BLM, 1984a). The WSA is estimated to have in-place resources of between 10 and 500 million barrels of oil as tar sand (SAI, 1982). BLM believes that within the WSA the in-place resources probably are toward the lower end of that range, perhaps on the order of 100 million barrels. If the tar sand were to be effectively mined, up to an estimated 80 to 90 percent would be recoverable after processing; however, the most likely extraction process in the San Rafael Swell STSA would appear to be by in-situ methods, which would result in about 30-percent recovery. Outcrops range from 3 to 60 feet thick and the petroleum content of most deposits is less than 10 percent. Localized occurrences of 5.0- to 16.8-percent petroleum content are known to occur in the STSA. The richer, better-exposed deposits occur mainly to the south of the WSA on Jackass Benches above Black Dragon Canyon and in Cottonwood Draw (near I-70). Measurements at Red Canyon and Lockhart Box showed deposits of 27 feet thick with 4-percent tar content.

Estimates of tar sand potential in the WSA are based on limited data and potential is considered moderate. However, preliminary indications are that the deposits are considerably smaller in extent and more limited in depth than the Sunnyside tar sand deposits east of Price. For comparison, based on the average estimated reserves of the four largest tracts, 28,664 acres in the Sunnyside STSA would have in-place reserves of about 2.3 billion barrels or nearly 20 times more oil in-place as that estimated for the Mexican Mountain WSA. However, none of the outcrop or probable reserves of the Sunnyside STSA are within a WSA, while 22 percent of the San Rafael Swell STSA (28,664 acres) is within the Mexican Mountain WSA.

Some or most of the tar sand in the WSA may have been removed by erosion where the Moenkopi Formation is exposed at the surface.

While tar sand is present, production within the WSA is unlikely due to low tar content and limited areas of favorable outcrop. There has been little or no industry interest in tar sand leasing or development for the WSA.

Coal

The WSA is not favorable for coal. There is a high degree of certainty that commercial coal deposits do not occur in the WSA.

Geothermal

The low rating for geothermal resources in the

WSA is associated with low temperature thermal waters (20 to 90 degrees Centigrade [C]). The rating is assigned based upon sulphur springs along the San Rafael River discharging at 15 to 23 degrees and geologic (Paleozoic) characteristics of the area. The low certainty was assigned due to the likelihood that an economic geothermal resource does not exist.

Potash

Because the WSA lies over the northeastern end of the Paradox Basin and potash-bearing rocks, deposits would tend to be deep, thin, and discontinuous if they occur. Thus, the low rating implies a potential for small deposits of less than 1 million tons to occur.

Hydropower

The WSA was rated with a moderate potential to produce up to about 15 megawatts of hydroelectric capacity. The potential was assigned on the basis of two sites identified by the Federal Energy Regulatory Commission. The high certainty rating is given due to the presence of a perennial stream, the San Rafael River.

The San Rafael River runs through nearly vertical-walled incised canyons creating the moderate potential for hydropower damsites. The sites are located near the San Rafael Reef and Black Box. Assuming that all water would run through the turbines and that operating efficiency would be 85 percent, the dams would be about 20 to 30 feet and 50 to 75 feet in height, respectively. No current interest in the identified sites is known to exist.

LOCATABLE MINERALS

Parts of 17 groups of mining claims totaling 176 claims are within the WSA and cover 2,350 acres. Eight claim groups covering 1,440 acres are in the vicinity of the San Rafael Campground. There is extensive overlap among these claims. One group of four claims (120 acres) is in Drowned Hole Draw. The eight remaining groups covering 790 acres are located around Sulfur Springs on the San Rafael River and on the rims north of Black Dragon Canyon. Assessment filings for all claims appear to be current. Many of the claims are not located on or above the Chinle Formation.

Uranium and Associated Minerals

The moderate rating for uranium/vanadium indicates an estimated deposit of 500 to 1,000 tons of uranium oxide. The high certainty rating reflects the WSA's position along a belt of known uranium deposits from which production has occurred.

MEXICAN MOUNTAIN WSA

Most significant uranium deposits in the San Rafael Swell occur in the Chinle Formation where mineralized solutions have migrated to a favorable host sandstone. The formation outcrops in the WSA in the cliff faces north of the San Rafael River, on the faces of the WSA's mountains, and in the cliffs south of the San Rafael River where it cuts the San Rafael Reef. Most large deposits found in the San Rafael Swell are in the southern belt favorable to uranium occurrence, roughly paralleling the Muddy and Dirty Devil Rivers. The Mexican Mountain WSA is in the northern belt, roughly paralleling the San Rafael River through the San Rafael Swell and extending southeast into Labyrinth Canyon.

Most uranium occurrences are within about 30 feet of the contact between the Moenkopi and the Chinle Formations, and there are a few small-scale prospects in the vicinity of the WSA. Workings in Red Canyon on the boundary of the WSA are abandoned. All deposits at or near the surface in the WSA have probably been located, while subsurface deposits of unknown size are certain to be present. BLM estimates that up to 1,000 tons of uranium oxide could be produced from the WSA. Numerous mines outside the WSA in the north belt have generally produced less than 500 tons of uranium oxide. Due to economic limitations, it is unlikely that new producible deposits of uranium will be found in the WSA. Potential is mainly limited to subsurface deposits that would require considerable drilling to locate and would be expensive to mine.

Vanadium exists in the San Rafael Swell and production is related to uranium, as discussed above.

Copper, Lead, Zinc, and Silver

Also associated with uranium are vanadium, copper, lead, zinc, and silver. The potential for commercial quantities of zinc or silver is very low. They are generally only found in small quantities.

Because copper occurs widely in the Colorado Plateau region, commonly in association with uranium, the Mexican Mountain WSA was rated low. Even though the Chinle and other exposed rocks are not considered particularly favorable for copper, the occurrence of this mineral cannot be completely ruled out. One recorded copper mine (the Copper Globe) located about 30 miles southwest from the WSA produced copper from the San Rafael Swell prior to 1920. Deposits present in the WSA would be expected to be small, or less than 50,000 tons of contained copper.

Manganese

Because the Chinle Formation, an occasional host rock for manganese, outcrops in the WSA, the area is thought to have a low favorability for manganese. No direct data are available and there are no known surface occurrences, mines, or known deposits in the vicinity.

Gypsum

Gypsum is present in the Carmel Formation. Potential uses would have to be local as the WSA is too far from principal markets to compete economically. Gypsum is relatively common in occurrence in the region. Potential local needs, such as coal mine dusting, could be met by deposits outside the WSA.

Sulphur

Sulphur is present in and around Sulphur Springs, along the San Rafael River south of the lower Black Box. The deposit is not extensive, has not been developed, and can only be reached by trail. Potential for development is low.

SALABLE MINERALS

Sand, gravel, and building stone are present along the San Rafael River. Surface collection of building stone has occurred just outside the WSA, west of Red Canyon along the river road. Demand is limited and the present area is adequate. While sand and gravel deposits occur, they are not of economic interest due to their location.

Wildlife

A variety of wildlife habitat exists in the Mexican Mountain WSA, but severe environmental constraints limit the number of most species present. Major species of interest include desert bighorn sheep, golden eagle, prairie falcon, peregrine falcon, and potentially black-footed ferret. Angora goats, although not considered wildlife, are present and compete with bighorn sheep.

Twenty-four bighorn sheep were released just south of the WSA in 1978 to reoccupy historical habitat. Within the WSA, 56,150 acres are bighorn sheep range, representing 27 percent of the total range for the North San Rafael herd. No fawning areas have been identified for the herd at this time. Present population within the WSA is estimated at 12 sheep while prior stable carrying capacity is considered to be 387 animals. Small developments of five springs and one catchment along the Reef and in Box Flat have been proposed to improve bighorn sheep habitat.

MEXICAN MOUNTAIN WSA

Mule deer also utilize the WSA, although in very small numbers. The entire WSA is included in the range for Deer Herd Unit 29, representing about 2 percent of the total range for the herd. Present population in the WSA is estimated to be at the carrying capacity of 66 deer. This deer range requires about 900 acres to support each deer.

Mountain lion are also present in small numbers due to the small size of prey populations. Desert cottontail rabbit are common. Other common furbearers and small mammals present include muskrat, beaver, ring-tail cat, gray fox, kit fox, bobcat, coyote, and a variety of rodents. One notable small mammal which could inhabit part of the WSA is the white-tail prairie dog, prey for the black-footed ferret.

The WSA is used by a large number of bird species. Raptors documented as nesting in the WSA include golden eagle (sensitive species) and American kestrel. Various other species also nest in the WSA. Migratory game bird species include ducks and the mourning dove, a common summer resident. Chukar partridge also inhabits about 41,130 acres of the WSA. Large numbers of perching song birds and a few shore birds are also present.

The 34 miles of the San Rafael River within the WSA support six known species of fish, including round-tail chub, speckled dace, flat-head minnow, red shiner, flannel mouth sucker, and bullhead sucker.

Three Federally endangered species are or are potentially found in the WSA. The black-footed ferret was identified as potentially inhabiting the WSA by the FWS. While the WSA is within the range for the black-footed ferret, no habitat is known to exist within the WSA. No sightings have been made within the WSA. No prairie dog towns (principal prey) are known to exist, but about 5 percent of the WSA has deep soils which might provide suitable locations for prairie dog towns.

Sightings have been documented of peregrine falcon (endangered) in or immediately adjacent to the WSA between 1952 and 1977. About 31,700 acres of potential nesting habitat are found within the WSA. The vicinity between Calf Canyon and Red Canyon, 11,290 acres, has been proposed as critical peregrine falcon habitat by UDWR (1977). Twelve falcon nests and three golden eagle (sensitive species) nests were identified within the WSA in a 1982 helicopter survey. Bald eagle, an endangered species, have also been sighted in the WSA during spring and fall migrations, although prey is not abundant.

Forest Resources

The dominant forest type is juniper-pinyon woodland. This community is used commercially throughout the Southwest for firewood, fenceposts, and Christmas trees. Scattered stands in the WSA are neither easily accessible nor especially productive. Fuelwood volumes are estimated to be less than 2 cords per acre. In addition, present access to almost all of the vegetation type is poor to nonexistent. Forest stands within the WSA are considered nonproductive in terms of forest products. More suitable stands for these uses are available elsewhere in the region.

Livestock and Wild Horses/Burros

The WSA contains portions of seven grazing allotments. Table 8 lists these allotments and contains grazing use data for each. Table 9 indicates acres and AUMs for the portions of allotments within the WSA.

The only range developments located in the WSA are two reservoirs near the San Rafael River road and two short allotment boundary fences. No new rangeland facilities for livestock are currently planned within the WSA.

The Mexican Mountain herd of wild burros, with a herd size of 10 to 15 animals, uses the WSA. Wild horses are not known to occupy the WSA.

Visual Resources

About 54,740 acres (92 percent) of the Mexican Mountain WSA are rated as Class A scenery due to the vertical relief, massive rock outcrops, unusual surface features, presence of the river, and vivid, rich color combinations (Roy Mann Associates, 1977). About 4,600 acres (8 percent) of Class B scenery and one small piece (260 acres near the Buckhorn Draw road) of Class C scenery occur around the edges of the WSA, mainly toward the southwest in areas with less topographic relief and less color variation. The sensitivity to potential changes in the landscape was rated high for groups using the WSA east of Red Canyon and moderate for those using areas to the west. Class B and C scenery areas in the WSA are in a foreground/midground view area from most vantage points. Management classes adopted are Class II (55,000 acres), mainly for areas with Class A scenery, and Class III (4,600 acres) for the remainder. Under Class II, changes to the landscape should not be obvious, while under Class III they may be evident but should not

MEXICAN MOUNTAIN WSA

TABLE 8
Livestock Grazing Use Data

Allotment	Size (Acres)	Active AUMs	Kind of Livestock	Season of Use	Number of Operators
Price River Resource Area					
Box Flat	26,285	410	Cattle	11/01 to 05/15	1
Calf Canyon	7,522	199	Cattle	11/01 to 05/15	2
Chimney Rock Flat	53,001	1,200	Cattle	05/01 to 11/30	1
Buckmaster	42,880	858	Cattle	12/01 to 04/30	1
San Rafael Resource Area					
North Sinbad	43,736	3,200	Cattle	11/01 to 05/10	8
Mexican Bend	12,415	977	Cattle	11/12 to 05/25	1
Black Dragon	54,846	3,223	Cattle	11/01 to 04/15	1

Source: USDI, BLM, 1979a and 1982c.

TABLE 9
Grazing Allotment Data

Allotment	Acres in WSA	Percent of Allotment in WSA	AUMs in WSA	Percent of AUMs in WSA
Price River Resource Area				
Box Flat	17,443	66	125	30
Calf Canyon	2,413	32	69	35
Chimney Rock Flat	2,058	100	8	
Buckmaster	7,042	16	3	less than 1
San Rafael Resource Area				
North Sinbad	11,576	26	385	12
Mexican Bend	12,415	100	977	100
Black Dragon	5,990	9	5	5
Nonallotted	663			
Total	59,600		1,809	

Source: USDI, BLM, 1979a and 1982c.

attract attention. (Refer to Appendix 7 for a description of BLM's VRM rating system.)

The geological setting of the WSA is clearly its most striking scenic feature. The variations in color, the unusual shapes and forms, and the sheer masses of rock create a vivid and unusual landscape. The river and the vegetation of the WSA add elements which provide texture and color contrasts.

Cultural Resources

One quarter section of this WSA (0.3 percent) has been inventoried for cultural resources and two

sites were recorded. Both were small lithic scatters with some identifiable tools. Three other sites have also been recorded within the WSA. All three are rock art sites. One has the possible remains of a structure associated with it and another is reported to have had a split twig figurine collected from it. No other inventory is known for the area. Although very little archaeological inventory has been completed in the WSA, a number of sites are known to exist that have not yet been documented. These sites are also rock art sites. Additional rock art sites of interest near the WSA have been documented, including petroglyphs and pictographs in Buckhorn Draw and Black Dragon Canyon. No National Register sites are in the

MEXICAN MOUNTAIN WSA

WSA.

There is one known historical inscription dated 1881 in the WSA. The inscription may either be associated with the Old Spanish Trail or the Old Railroad Grade. A remnant of the Old Spanish Trail just north of the WSA has been considered for nomination to the National Register of Historic Places in May 1975. Another remnant is thought to be within the WSA but has not been documented. The trail was a primary travel route between New Mexico and California in the mid-19th Century. The Old Railroad Grade was constructed in the 1880s and then abandoned. Worker camps, bridges and old ties are found along the grade. It was intended to be part of a cross-country rail route and now forms part of the eastern boundary of the WSA.

Swasey's Leap is a narrow point in the Lower Black Box where Sid Swasey, on a bet with his brothers, reportedly jumped a horse across the canyon. At a later date, someone placed poles and an old wagon box across this point to form a bridge. This bridge is still in place but its timbers are rapidly rotting away, and it will probably fall into the canyon bottom in the near future.

Mexican Bend is a location with Western outlaw history and it was a frequent camp of the Wild Bunch. Evidence of a corral and camp can still be seen at Mexican Bend.

The abandoned Smith Cabin and corrals are located on the east boundary of the WSA.

Recreation

Road access to the WSA exists around most of its perimeter. About 9 miles of County Road 6768, the San Rafael River road, is "cherry-stemmed" from the WSA. This road receives use for vehicle sightseeing to the east end of the Upper Black Box, for groups hiking or floating the Black Box, and by livestock operators.

No developed trails are within the WSA. The abandoned road segment east of the county road is suitable for use as a trail for about 4 miles. The terrain and vegetation do not prohibit finding or establishing suitable routes for travel on foot, although they may vary in degrees of challenge. Most negotiable routes in the more rugged canyon terrain are limited to drainage bottoms or rims until a rare route crossing between the two is located. The San Rafael Reef and the hummocky rock outcrops near its top are also negotiable, although slope and terrain features make the climb challenging. Some routes require short, near vertical rock scrambles or technical ascents.

The San Rafael Campground is located adjacent to the west side of the WSA. It has eight camping units, water (in the summer), toilets, and a capacity for 50 people.

Interpretive guidebooks for the canyon country often have information which applies to the San Rafael Swell. One guidebook for hikers is known to cover hiking in the WSA (Hall, 1982). No commercial outfitting services are presently offered.

Many features that make the WSA attractive to recreationists are discussed above, including the scenic, historical, archaeological, and wildlife values present. In addition to these, riparian sites at springs and along the river provide excellent primitive campsites. Outstanding opportunities for other recreational activities also exist.

Floatboating and tubing occur along the San Rafael River. Floatboating only can occur during spring runoff, generally about 2 to 4 weeks during May or June, when flows are adequate. It is limited to small craft, such as a kayak, and during peak flows requires a high degree of technical boating skill to negotiate the Black Boxes (upper and lower). Only a few parties have successfully floated through this stretch of river. The 2- to 5-mile flat water stretches above, below, and in between the Black Boxes also are floatable at moderate to high water levels. There are adequate flows for tubing from May through mid July and in wetter years throughout the summer. Tubing through the Black Boxes requires some maneuvering to avoid obstacles, and occasionally some walking. Both floatboating and tubing are challenging activities in a very scenic setting. The 110 miles of the San Rafael River are being considered in a Nationwide Rivers Inventory, with potential for study and addition to the National Wild and Scenic Rivers System (USDI, National Park Service [NPS], 1982). About 34 miles of the river are within the Mexican Mountain WSA. Since it is an inventory-listed segment, the BLM must, as part of its environmental review process, avoid or mitigate adverse impacts to these rivers and consult with the NPS before taking any action that could foreclose wild, scenic, or recreational river status (Council on Environmental Quality, 1980).

The most frequently hiked portions of the WSA at this time are the Black Boxes, when the water level has dropped. Other potential hiking routes are numerous with the most obvious being the canyon bottoms. Creative route finding is necessary to locate passages out of the heads of most of the canyons. The hummocky landscape on top

MEXICAN MOUNTAIN WSA

(to the north) connects all the canyons providing an infinite number of possible routes among the Navajo Sandstone buttes and domes. The Reef itself can be traversed on foot in many locations. However, most of the short, steep canyons in the Reef are dead ends. Horse activities could occur but routes or trails are limited by terrain. Scenic horse trails exist across the hummocky landscape north of the major cliff, in Nates Canyon and along the San Rafael River.

Fishing, hunting, rockhounding, and snow sport opportunities, while present, are limited due to poor fishery productivity, small game populations, lack of known gem quality stones, and generally inadequate snow. The WSA is well suited to hobby activities, such as photography.

A number of technical climbing routes are possible in the Black Boxes, ranging in difficulty from a scramble to a technical rock climb. Similar climbing opportunities may be found in the harder, more resistant sandstone walls, particularly the Navajo, elsewhere in the WSA. The nearest Navajo Sandstone wall known to have been used for technical rock climbing is in Buckhorn Draw.

ORV use in areas around the San Rafael Campground and Buckhorn Draw is a popular activity, particularly on Easter weekend. Heavy use extends down the San Rafael River as far as about Oil Well Draw on the south and Red Canyon on the north. Areas of interest to ORV users also include Mexican Bend and Swasey's Leap. Well established four-wheel drive trails lead east from the "cherry-stemmed" county road to Mexican Bend north of the San Rafael River. A similar trail also extends from Jackass Benches to a point near Swasey's Leap. Washes along the county road also show periodic evidence of ORV use. Many routes south of the county road are used to access the river or views of the river in the Black Box. Often, rather than for ORV recreation, the more established routes are used for sightseeing by vehicle. Vehicle camping along the San Rafael River occurs in the spring, winter, and fall.

Prickly Pear Flats is another area that receives some ORV use and vehicle camping around established access, with use primarily occurring on Easter weekend. Vehicle recreation also occurs in Box and Jackass Flats, with most use occurring north of the WSA.

ORV use in total currently utilizes or affects about 20 miles of vehicular ways and 3,000 acres in the WSA.

Comprehensive data on current recreational use

levels are not available. The WSA is frequently used by floatboaters, tubers, hikers (mainly the Black Boxes), sightseers, and ORV enthusiasts. As indicators of possible use levels in the vicinity, in 1982, 2,074 people signed the visitor registers at the petroglyph panels along the county road in Buckhorn Draw and in the San Rafael Campground.

Present recreational use in the WSA primarily occurs along the San Rafael River. It is primarily: (1) vehicle-oriented camping, picnicking or sightseeing; or (2) hiking and/or floating the river through the Black Boxes. It is estimated that ORV use accounts for about 1,000 visitor days per year while primitive recreational use accounts for about 500 visitor days. These estimates are very general approximations.

Wilderness Values

SIZE

The size of the WSA (59,600 acres) is sufficient to enhance wilderness values present. The configuration of the WSA west of Red Canyon, however, does not promote wilderness uses or values. The bottoms along the river road are not within the WSA. Vehicle access currently exists to the periphery of the WSA above the rims in this area, and the land area between road access and the rims is not large. The configuration of the remainder of the WSA, in combination with topography, enhances or supports wilderness values.

NATURALNESS

The most important natural features of the WSA primarily are a result of its geology. The ruggedness of the terrain contributes to its suitability as nesting habitat for raptors, habitat for desert bighorn sheep, and scenic interest. The San Rafael River runs through the WSA, cutting deep canyons in the geologic formations and providing an important perennial water source with its riparian vegetation.

Substantially noticeable concentrations or individual imprints are minimal within the WSA. Two short gap fences of about 0.75 and 0.50 mile each cross the river road. There are also two reservoirs along the road and two short ways, leading south toward views of the Black Box. Two short ways also reach the Black Box from the south, one 0.25-mile-long west of Lockhart Box and the other a 0.50-mile loop into the WSA, north of Jackass Benches. From the end of the river road, extending about 4 miles around Mexican Bend, are an abandoned access way, drill site, and air

strip. Another way of about 0.5 mile enters the WSA to a point west of Swasey's Leap. West of Oil Well Draw and south of the San Rafael Campground there are concentrations of ORV tracks. There is also one small mine prospect in Red Canyon. All imprints together affect less than 3,000 acres (5 percent) of the WSA and meet the naturalness criterion for areas under wilderness review since they are not substantially noticeable in the WSA as a whole. The other 95 percent of the WSA also meets the naturalness criterion because it is free of imprints. Within this latter area, about 3,000 acres (5 percent) of the WSA are estimated to consist primarily of relic plant communities (largely uninfluenced by human activities) and could be considered untouched. These are areas which are dominated by rock outcrop and are inaccessible to livestock or ORV use.

SOLITUDE

Size enhances wilderness values and opportunities present in most of the WSA.

The WSA configuration west of Red Canyon constrains opportunities for solitude, particularly when considered together with ORV activities now taking place in this portion of the WSA and outside its boundaries (refer to the Recreation section). This portion of the WSA includes two strips of land ranging from .25 to 3 miles in width with surface features not conducive to wilderness management.

By contrast, complementing configuration and topography promote opportunities for solitude east of Red Canyon. The entrenched meanders of the Black Box and its immediate drainages, while having vehicle access to the north and south, are separated by such severe vertical relief that they are segregated from activities above them. Topography plays a similarly prominent role elsewhere in the WSA. There are about 60 miles of the major canyons cutting and twisting their way through resistant rocks. Separate from these, except for an occasional passage, are the rolled domes above the rims and the slopes of the San Rafael Reef.

Vegetation often complements topography in providing screening to enhance opportunities for solitude. This occurs primarily in two tree-dominated vegetation types, juniper-pinyon and riparian. The juniper-pinyon type occurs in approximately 34 percent of the WSA and contributes most significantly to solitude where it is interwoven among the rocky hummocks in the northern portion of the WSA. In addition, there are several small pockets of riparian vegetation in canyon bottoms, which are tree dominated.

The only off-site influences affecting opportunities for solitude are vehicle recreation and occasional surface collection of building stone which are discussed above. These activities occur along the boundaries of the WSA and are concentrated around the San Rafael Campground and along the San Rafael River road. They limit the ability to find a secluded spot in the immediate vicinity.

In summary, in about 90 percent of the WSA (53,600 acres), opportunities for solitude (based on configuration, topographic relief, vegetation screening, and the ability to find a secluded spot) meet the outstanding criterion for areas under wilderness review. This encompasses an area about 7 to 11 miles north to south and about 10 miles east to west, excluding an area paralleling the river road. On 6,000 acres west of Red Canyon and along segments of the river road, opportunities are less than outstanding and do not meet the criteria due to configuration and sights and sounds associated with vehicle use.

PRIMITIVE AND UNCONFINED RECREATION

Recreational opportunities in the WSA are discussed above (refer to Recreation section). Those outstanding primitive recreation opportunities for which the WSA is best suited include hiking, camping, floatboating/tubing, and sightseeing activities related to the WSA's scenic, cultural, and nongame wildlife features. Based on these activities, the WSA (59,600 acres) meets the outstanding primitive recreation criterion for areas under wilderness review.

Opportunities for fishing and hunting, while present, are very limited due to very small game populations and poor fishery productivity/species composition. Horseback activities could potentially occur in the WSA, but would be limited by terrain and the small number of suitable routes or trails.

SPECIAL FEATURES

The combination of geologic surface features present are not found to the same extent anywhere else in the San Rafael Swell. There are only a few canyons in Utah that can be compared to the entrenched, very narrow gorges of the Black Boxes of the San Rafael River.

The WSA contains the greatest diversity of surface geology of any area its size in the San Rafael Swell. The oldest rock exposed in the San Rafael Swell is the White Rim or Coconino Sandstone exposed in the Black Boxes. It is exposed elsewhere in Utah, although not in a similar gorge. The hummocks in the Navajo Sandstone north of the San Rafael River are also unusual. The Reef,

found in two other WSAs to the south (San Rafael Reef and Crack Canyon WSAs), is a unique formation due to the violent pitches in the rock. In Mexican Mountain WSA it begins at its base with steep-sloped Carmel and Entrada Sandstones cut by narrow clefts and rises to pitched Navajo Sandstone points or sandstone hummocks.

Historical and archaeological features are not fully documented. Evidence at this time does not indicate unusual sites or concentrations of sites relative to the surrounding area. A potential for unusual historical evidence exists, given the known combination of sites and activities in the immediate vicinity of the WSA, including the Old Spanish Trail, the Old Railroad Grade, historical agriculture, and use by outlaws.

Special wildlife habitat features present in the WSA include springs, the San Rafael River, riparian associations, a cliff line suitable for raptor nesting, and at least one bighorn sheep cave.

Habitat for three threatened or endangered plant species also is present in the WSA.

Land Use Plans and Controls

Ownership both within and adjacent to the WSA is primarily Federal land, with the surface and mineral estates managed by BLM. There are five in-held State sections in the WSA. These parcels are located partially in wash bottoms and partially on cliff and rubble land.

Eight State sections are adjacent to the WSA. One large block of State land is located 1 to 2 miles north of the WSA. Access to this land is not through the WSA. Present use of this block is for grazing and a utility corridor.

No lands within the WSA are under withdrawal for any special use or purpose. A 130-foot-wide right-of-way (U-10657) for a powerline forms a portion of the east boundary of the WSA. No rights-of-way are inside the WSA. Current access to the WSA is provided by BLM and county-maintained roads.

Public lands in the WSA are managed by the Price River and San Rafael MFPs. Of the lands in the WSA, 30,600 acres (51 percent) are covered by the Price River MFP and 29,000 acres (49 percent) by the San Rafael MFP. Specific management objectives identified for the WSA and immediate vicinity include: (1) finalizing inventory of remnants of the Old Spanish Trail to determine the quality, quantity, and significance of evidence present for potential National Register of Historic

Places nomination; (2) development of five springs and one catchment along the San Rafael Reef and in Box Flat, primarily for use by bighorn sheep; (3) continuation of present grazing management and practices; and (4) maintenance of scenic, natural, and primitive recreation values. Existing oil and gas leasing categories would be maintained.

The UDWR has also been active in land use plans for management of wildlife species, including reintroduction of 24 desert bighorn sheep near the WSA and performing an endangered species inventory which led to the 11,289 acres of critical nesting habitat area for peregrine falcon. The majority of the habitat area is within the WSA. UDWR plans to introduce 30 additional bighorn sheep into the WSA in 1986.

Potential wilderness land uses in the vicinity of the WSA are being studied in five other WSAs in the San Rafael Swell.

In the *Emery County Zoning Plan* (Emery County Board of Commissioners, 1984), the WSA area is zoned as M&G-1 (mining and grazing). Recently, the Emery County Economic Development Council has been investigating the possibility of proposing National Park status for Mexican Mountain and Sids Mountain WSAs to preserve environmental values while maximizing tourism and related local economic return.

Socioeconomics

DEMOGRAPHICS

The WSA is located in the central portion of Emery County. Socioeconomic effects related to the WSA are of concern countywide, with some interest to Carbon County. Emery County had a population of 12,900 in 1982 (U.S. Department of Commerce [USDC], Bureau of the Census, 1981), not quite 1 percent of the State population. Most of the population occurs in Castle Valley, the northwestern part of the county. There are two service centers in northwestern Emery County: Castle Dale, the county seat (1980 population of 1,910), and Huntington (1980 population of 2,316). Other towns in Castle Valley are Elmo (1980 population of 300), Cleveland (1980 population of 522), Orangeville (1980 population of 1,309), Ferron (1980 population of 1,718), and Emery (1980 population of 372). The Town of Green River is located in the southeastern part of the county and has a population of 1,282. Green River is the closest town to the WSA.

Emery County contains 4,449 square miles of land or about 2 million acres. About 81.7 percent

of the county is owned by the Federal Government, 10.7 percent by the State, and 7.1 percent by private residents. The WSA includes about 2.1 percent of the acreage in the county.

EMPLOYMENT

Statistics indicate that almost half of the county income earned in Emery County and about 40 percent of the employment is from mining, mostly of coal (USDC, Bureau of the Census, 1981) (refer to Table 10). Construction and operation of public utilities associated with Utah Power and Light Company's Huntington and Hunter powerplants are Emery County's next most important sources of employment and income. Agriculture accounts for about 0.6 percent of the county income and less than 1 percent of total employment.

The nonagricultural income for 1981 and employment for the third quarter of 1982 are shown in Table 10.

TABLE 10
1981 Personal Income and Employment
Emery County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1
Mining	48	39
Construction	23	17
Manufacturing	Less than 1	Less than 1
Transportation and Public Utilities	15	13
Wholesale Trade	1	1
Retail Trade	2	6
Finance, Insurance and Real Estate	1	1
Services	2	6
Other	-	-
Total Private Industry	93	85
Federal Government	1	3
State and Local Government	6	12
Total Government	7	15
Total Nonagricultural	100	100
Unemployment (1st Quarter, 1983)		9.3
	(Dollars)	(Jobs)
Total Employment and Earnings	\$128,985,000	6,165
Total Personal Income	\$ 97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated. Tourism is included as part of Services, Retail Trade, and Other Services.

During 1970-1980, Emery County experienced the largest percentage change in population, increasing by 109.7 percent—5,137 to 11,451 persons (USDC, Bureau of the Census, 1981). This increase was caused by construction of the powerplants mentioned before and related support activities, such as coal mining. The local economy is most affected by changes in the coal market and has seen periods of boom and bust at various times during the county's history. Since 1982 the local coal industry has been in a slump. Despite a 17-percent decrease in employment between 1981 and 1983, it remains the largest employer in the area (Utah Department of Employment Security, 1981 and 1983).

INCOME AND REVENUES

Past activities in the WSA that could be of local economic consequence include mineral assessment, livestock production, and dispersed non-motorized recreation. The WSA has 176 mining claims that are current in assessment work. Regulations require a \$100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy. Fifteen livestock operators have grazing privileges in the WSA. Based on the consumption of 1,809 AUMs of forage by cattle, it is estimated that the WSA accounts for \$36,180 of livestock sales, including \$9,045 of ranchers' returns on labor and investment.

The WSA's nonmotorized recreation use is low and, related to total local expenditures, is insignificant. The WSA, particularly the western part, accounts for some ORV use. However, local expenditures are neither significant to the region nor to any particular business. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Mexican Mountain WSA is estimated as about 1,500 visitor days/year resulting in a total estimated expenditure of \$6,150 annually. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Emery County.

The WSA generates revenues to the Federal Treasury from two sources: grazing and mineral leasing. Within the WSA, about 35,272 acres are currently leased for oil and gas. At \$3 per acre, this generates about \$105,816 annually. Half of this, or about \$52,908, is allocated back to the

State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 1,809 AUMs of forage consumed by livestock in the WSA and a grazing fee average of \$1.40, the WSA annually accounts for \$2,533 of grazing fee revenues to the Treasury. Fifty percent of this is allocated back to the local BLM District for the construction of range improvement projects.

Table 11 summarizes income and revenue related to the Mexican Mountain WSA.

TABLE 11
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	\$105,816
Mining Claim Assessment	\$17,000	None
Livestock Grazing	\$36,180	\$2,533
Recreational Use	Less than \$6,150	None
Total	Less than \$59,930	Up to \$108,349

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for all Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to de-

velop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas, tar sand, and locatable mineral exploration and development and concentrated ORV use in certain areas of the WSA. Even though the area would be open to resource use and development without control for wilderness protection, it is likely that little overall development of mineral resources would occur within the foreseeable future. This would be due to the low potential of the area for mineral development and the majority of the area's rough and restrictive terrain. ORV use in concentrated areas within and adjacent to the WSA is expected to increase.

The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: oil and gas, 160 acres; tar sand, 610 acres; uranium/copper, 40 acres; manganese, 30 acres; potash, 40 acres; and, hydro-power, 880 acres. This would total 1,760 acres. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Disturbance of 1,760 acres could result in increases of fugitive dust emissions, especially while activities were in progress. Although all of the activities listed above would likely not occur, a worst-case analysis indicates the possibility of significant air quality degradation during construction or mining

operations. Fugitive dust conditions may be adverse during construction activities and other emissions (sulfur dioxide and nitrogen dioxide) may occur during tar sand mining operations if heat processes are utilized. Control efforts would be required to minimize adverse conditions and to meet Class II standards.

GEOLOGY

Although surface disturbance in relation to mineral exploration and development is estimated at 1,760 acres within the WSA, the impact to geologic conditions would be small. Localized change (excavations and embankments) could occur during construction and mining activities (particularly surface mining) but these would not be significant compared to the massive geologic formations of the area. Some subsidence and fracturing of formations related to tar sand extraction could occur on portions of the 28,664 acres of the WSA in the San Rafael Swell STSA.

SOILS

It is estimated that up to 1,760 acres of soil could be disturbed by mineral exploration and development and construction of dams and clearing of a reservoir basin. The average annual rate of soil loss would increase from 0.35 to 1.8 cubic yards/acre; therefore, the soil loss on the 1,760 acres would increase from 616 cubic yards/year to 3,168 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 2,552 cubic yards (12 percent) over current annual soil loss. The likelihood of this occurring is low because soils subject to severe or critical erosion tend to occur as pockets of fine sandy soil and can be avoided and 880 acres of disturbance would be inundated by water. Also, estimated surface disturbance of that magnitude is not expected to occur due to low mineral potential in the area.

VEGETATION

The anticipated maximum of 1,760 acres disturbed could impact the WSA's vegetation, especially if disturbance were to occur in the form of roads, pads, removal of tar sand, and flooding caused by a hydroelectric dam. The likelihood of this magnitude of development is low. Any impacts to the sparse vegetation of the WSA would not, by themselves, be significant; however, certain areas such as riparian zones that are key wildlife habitat could be significantly impacted.

Eight species of candidate, proposed endangered, or endangered plants are found in or near the WSA. Site-specific clearances would be conducted prior to any authorized surface-disturbing activity. If these species could be affected, the BLM would consult with the FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of these endangered or sensitive plants would be preserved under the No Action Alternative.

WATER RESOURCES

Certain impacts to water would interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect water quality. Most erosion within the WSA is natural rather than caused by human activity. Surface disturbance from mineral and hydraulic exploration and development and reservoir construction could impact 1,760 acres under this alternative, with a soil loss increase of up to 2,552 cubic yards/year. The turbidity and sediment impact to water resources would be significant if all expected surface-disturbing activities were to occur. This impact would be most severe in the San Rafael River for a short period when disturbance was initiated, but would be reduced as activities were completed and reclamation carried out. The rocky nature of much of the WSA would tend to lessen the potential adverse effect.

The most significant potential effects on water resources would occur if potential hydroelectric dams and reservoirs were constructed at the San Rafael Reef and/or Black Box sites on the San Rafael River. Impoundments created by the dams would dramatically alter the character of the stream, both within the area inundated and downstream. Within the impoundment area, the free-flowing river would be changed to flat water, sediment buildup would gradually occur as the river's silt load settled out, and existing types of uses in the river canyon would be eliminated. Downstream the river would be regulated (at least partially) which could tend to reduce spring peak flows and stabilize seasonal flow regimens. Water quality might be slightly improved due to less turbidity. Reservoir depths would be too shallow to result in significant downstream water temperature change.

In the worst-case scenario it is conceivable that water resource development and soil disturbance could occur on 1,760 acres. However, the proba-

bility of this occurring is unlikely in the foreseeable future due to management limitations in current BLM land use plans, low interest in hydroelectric and mineral development in the WSA, and economic factors. Therefore, with this alternative, no substantial impacts to surface water resources are expected in the foreseeable future. If tar sand were extracted by in-situ methods, degradation of ground water quality would result.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same (22,510 acres in Category 1, 7,280 acres in Category 2, 9,010 acres in Category 3, and 20,800 acres in Category 4). The wilderness stipulations on 35,192 acres of post-FLPMA leases would be removed. There would be an additional 3,528 acres available for lease (Category 1, 2, or 3). About 35 percent of the WSA would continue to remain closed to leasing (Category 4).

The WSA is considered low in potential for oil and gas occurrences with less than 10 million barrels of oil (3 million estimated recoverable) and less than 60 billion cubic feet of natural gas existing (18 billion cubic feet recoverable). These oil and gas resources could be explored and developed without concern for wilderness protection. Due to the 20,800 acres in Category 4 (closed to leasing) about one-third of the recoverable oil and gas resources in the WSA could be foregone. Due to the low potential and interest in the area, rugged terrain, and management controls on development, significant oil and gas development would be unlikely.

Tar Sand

According to SAI (1982) the potential exists for between 10 and 500 million barrels of oil from tar sand within the WSA, of which about 150 million barrels could be recovered. BLM estimates about 100 million barrels as recoverable. Of this, only 30 million barrels are considered recoverable by in-situ methods. Present information on the existing deposit and low industry interest suggest that tar sand development in the WSA is not likely in the foreseeable future. No tar sand leases or conversions exist within the WSA. Therefore, with this alternative, tar sand could be developed without wilderness considerations, although various factors suggest that this will not occur.

Geothermal

Due to low water temperature and distance from

potential users, no development of geothermal resources is anticipated; however, with this alternative, leases could be issued without wilderness consideration.

Potash

The entire WSA would be open to potash leasing. Indications are that there is potential for less than 1 million tons of potash under the WSA. Of that, up to about 750,000 tons are considered possibly recoverable. The rugged surface of the WSA, when compared to producing areas, the low prices, and more feasible areas in the general region, indicate that interest in exploration, leasing, or development of the potash resource is unlikely.

Hydropower

The potential exists for a small-scale hydroelectric development on the San Rafael River within the WSA. This potential would continue under the No Action Alternative, with two sites identified. There is no current interest in these sites, and the potential of development is questionable.

Locatable Minerals

Locatable mineral development could occur within the WSA. The entire area would remain open to mining claim location. The potential recovery of small quantities of uranium oxide, vanadium, copper, lead, zinc, silver, manganese, gypsum, and sulphur could be possible, although the likelihood of commercial quantities of lead, zinc, or silver is very low. Gypsum and sulphur in the WSA are not likely to be extracted. Minerals with some estimated recovery potential are shown in Table 6. Even for the minerals listed (uranium, vanadium, copper, and manganese) the current market conditions suggest that no mineral production would occur in the WSA within the near future. However, with this alternative, these minerals, should they exist in minable deposits, would be available for recovery without wilderness limitations. Surface deposits have been explored and subsurface deposits might be located; however, due to rough terrain and the depth of resources, extensive drilling and mining efforts likely would be required.

Salable Minerals

With this alternative, no use of salable materials (i.e., gravel, building stone) from within the WSA is anticipated.

WILDLIFE

Wildlife species, particularly those sensitive to surface disturbance or human interference, could be adversely affected by possible surface dis-

MEXICAN MOUNTAIN WSA

turbance associated with energy and mineral exploration and development (1,760 acres), especially if this disturbance were to occur in the form of roads, drill pads, tar sand extraction, and flooding from hydroelectric development. Species most likely to be affected would be bighorn sheep and nesting raptors, including golden eagle and peregrine falcon.

Of the 56,150 acres of bighorn sheep habitat within the WSA, up to 7,000 acres could be rendered unsuitable by development and the encroachment of human activity. Most of this is likely to occur in the eastern two-thirds of the WSA. While bighorn sheep populations would be expected to continue to increase from the present population of 12, carrying capacity would be reduced from 387 to 339.

Raptor nesting adjacent to existing and newly established vehicle use areas would be adversely affected where use is concentrated. Suitable nesting habitat for peregrine falcons would be reduced over time from about 31,700 to 24,700 acres. Available nesting habitat for other raptors would also be expected to diminish from the entire WSA to 52,600 acres with increased human encroachment and surface-disturbing activity. Future use of the 12 known falcon nests and three known golden eagle nests could be influenced.

If the area used by the peregrine falcon and golden eagle could be affected, BLM would initiate Section 7 consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these raptors, it can be reasonably concluded that the viability of populations of these endangered and sensitive species would be preserved under the No Action Alternative.

The availability of water through the development of up to five springs and one catchment could improve distribution of bighorn sheep. Development under this alternative would be allowed without consideration of wilderness values.

In conclusion, sensitive wildlife species would be adversely affected if potential surface disturbance of 1,760 acres occurred within the WSA. Most impacts would be short term while projects were taking place. However, expected activities include hydroelectric development (dam construction and reservoir impoundment) and extraction of tar sand deposits, possibly resulting in long-term impacts. Reclamation measures might not restore lost habitat for sensitive species.

Surface disturbance of this magnitude will probably not occur due to low potential, lack of interest, restrictive terrain, and economic feasibility. ORV use would expand beyond the 8,000 acres now used and habitat for some wildlife species would be adversely affected by this increase.

FOREST RESOURCES

There is a limited source of trees within the WSA and occasional use of firewood by campers and hikers would continue to occur in the area. Surface-disturbing activities could have an impact on those species present; however, reclamation efforts could offset this over the long term. Any impacts to forest resources would be insignificant.

LIVESTOCK AND WILD BURROS

Domestic livestock grazing would continue as authorized in the San Rafael and Price River MFPs. The 1,809 AUMs currently allocated in the WSA are assigned to 15 livestock permittees. Existing range facilities (two reservoirs and two short allotment boundary fences) could be maintained by mechanical methods. Motorized vehicles are currently being used along the "cherry-stemmed" road and into the WSA along the way to Mexican Bend to manage livestock in the WSA. With this alternative, motorized vehicle use along the way to Mexican Mountain could continue. New rangeland developments could be implemented without wilderness considerations. Although none are now planned, additional roads or other facilities for livestock management and use could be proposed and developed in the future.

The herd of wild burros within the WSA would likely remain and would be managed as per the *Wild Horse and Burro Act* (USDI, BLM, 1971).

VISUAL RESOURCES

Visual quality in the Mexican Mountain WSA would be managed within limitations placed on potential surface-disturbing activities (i.e., ORV use would be limited to existing roads and trails on 36,000 acres; 7,280 acres would be leased for oil and gas with special stipulations; 9,010 acres would be leased with no surface occupancy, and 20,800 acres would be closed to leasing; and 55,000 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

However, with this alternative, 1,760 acres of potential mineral-related exploration and development are estimated. Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual quality

MEXICAN MOUNTAIN WSA

would be degraded in localized areas during the period of activity. VRM objectives probably would not be met in VRM Class II or III areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If roads, drill pads, tar sand extraction, and hydroelectric sites are scattered throughout the WSA (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. This magnitude of disturbance, however, is unlikely.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided by law and regulation. There is a potential for 1,760 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in disturbed areas or where annual assessment work on mining claims occurs and vandalism of sites could increase. There are no existing National Register sites within the WSA.

RECREATION

ORV use would be limited to existing roads and trails on 30,600 acres in accordance with the San Rafael MFP. This designation would not apply to the County road to the Mexican Mountain area. Total ORV use and recreational use associated with vehicles in the WSA are estimated at 1,000 visitor days per year.

Primitive recreation values would be foregone on and around the 1,760 acres where potential mineral and energy surface-disturbing activities could take place. Primitive recreation use in the WSA is estimated at 500 visitor days/year. The future increase in recreational use of the Mexican Mountain WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent/year over the next 20 years. At this rate, overall recreational use is expected to increase from 1,500 current visitor days/year to 2,235 visitor days at the end of 20 years. Assuming that the 2-percent increase would be uniform among all recreation uses in the WSA, primitive recreational use would increase from the estimated current use of 500 visitor days per year to about 745 visitor days per year over the next 20 years. Likewise, recreational activities utilizing vehicular access would increase from about 1,000 visitor days per year to 1,490 visitor days.

Some of the estimated 1,760 acres of surface disturbance (including 880 acres associated with potential hydropower development) that could occur in the future would degrade naturalness, solitude, and scenic values in localized areas, including areas along the San Rafael River, a Nationwide Rivers Inventory listed segment. The current approved land use plans would determine land management direction for recreation and other activities. Within the WSA the segment of the San Rafael River with potential for study and addition to the National Wild and Scenic Rivers System would continue to be managed under the provisions of the August 2, 1979, Presidential Memorandum regarding Wild and Scenic Rivers and National Trails. An August 10, 1980, Council of Environmental Quality Memorandum outlines specific actions for interagency consultation to avoid or mitigate adverse effects on rivers in the Nationwide Rivers Inventory. These procedures are required as part of the environmental analysis process regarding any proposed action that would impact an inventory river. The wild and scenic values of the river would be considered on a case-by-case basis in consultation with NPS but would not necessarily receive added protection. Assuming that the potential hydropower projects would be constructed, significant changes in river recreation would occur, virtually eliminating the existing types of water-oriented activities in much of the WSA. Such an assumption represents a worst-case impact to wilderness and primitive recreation values. Protection of the wild and scenic values of the San Rafael River might actually preclude hydropower development or other surface-disturbing activities along the river.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the San Rafael and Price River MFPs. With this alternative, wilderness characteristics in portions the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e., ORV use would be limited to existing roads and trails on 30,600 acres; 7,280 acres would be leased for oil and gas with special stipulations; 9,010 acres would be leased with no surface occupancy, and 20,800 acres would be closed to leasing; and 55,000 acres would be managed under VRM Class II objectives requiring that activities not be apparent). However, under this alternative, 1,760 acres of surface disturbance from potential mineral exploration and development and reservoir construction are estimated, although the likelihood of this occurring is low. Should this disturbance occur in the form of roads, pads, extrac-

MEXICAN MOUNTAIN WSA

tion of tar sand, and hydroelectric development it would result in a significant loss of naturalness, solitude, and outstanding opportunities for primitive and unconfined recreation.

While rugged terrain would preserve some areas offering outstanding opportunities for solitude and primitive recreation, the ability to find a secluded spot away from evidence of man's activity would be diminished around areas of surface disturbance (1,760 acres) and concentrated vehicle use. Considering the terrain, present uses, and areas of potential development the most likely locations for these changes to occur would be in western portions of the WSA and along the San Rafael River canyons and bottoms.

Special features (e.g., scenic, wildlife, and cultural values) could be diminished by surface disturbance. Because vehicle access and ORV use would increase, vandalism of special cultural resource values similar to that occurring in adjacent areas (i.e., Buckhorn Draw) could take place.

LAND USE PLANS AND CONTROLS

To the extent that use and permitted development degraded habitat quality, this alternative would not be consistent with peregrine falcon and bighorn sheep management plans of the State of Utah (UDWR). It would be consistent with Emery County zoning. The existing Price River and San Rafael MFPs do not recommend wilderness designation; therefore, this alternative would be consistent with existing BLM land use planning documents. Plans of other agencies would not be affected. The WSA could become a portion of a National Park as being considered by the Emery County Economic Development Council. However, because the WSA would remain open to development, disturbance could reduce the potential of the area for National Park status.

SOCIOECONOMICS

No changes are expected in existing patterns and trends of population, employment, and personal income. Economic development of resources in the WSA would not be affected. Local income related to existing mining claim assessment (refer to Table 11) could continue and increases in income could occur if new mining claims are located in the WSA. The potential for economic benefits related to extraction and marketing of commercial mineral deposits in the WSA would remain. However, as noted previously, the likelihood of energy and mineral development is low in the foreseeable future and there is limited possibility that significant economic gain would be obtained. The \$105,816 per year in Federal oil and

gas lease revenues generated within the WSA could continue and could be increased by as much as \$10,584 with additional leasing of 3,528 acres.

Domestic livestock grazing (1,809 AUMs) would continue as authorized in the Price River and San Rafael MFPs, with related income and revenues as shown on Table 11.

Local expenditures related to recreation would continue and could increase from \$6,150 to \$9,164 for a net increase of \$3,014.

Overall, the local economic impact would be considered insignificant, although the future potential for development would remain.

All Wilderness Alternative (59,600 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 59,600-acre area would be related to its withdrawal from mineral location, and closure to new mineral leasing and sale and ORV use. The entire area would be placed in leasing Category 4 (closed to leasing). All 59,600 acres would be closed to vehicular use, except for approvals by BLM as discussed in the Description of the Alternatives section. About 20 miles of existing vehicular ways and ORV trails would not be available for vehicular use except as indicated above. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing mining claims would eventually be explored and developed causing an estimated 70 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities, and the two hydroelectric sites would not be developed. Oil and gas leases would not be renewed and future leasing (including tar sand and other leasable minerals) would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas for this alternative would be only 70 acres, compared to 1,760 acres as assumed for the No Action Alternative, the impacts from development and surface disturbance on geology, forest resources, and cultural resources under the All Wilderness Alternative would be insignificant as described for the No Action Alternative. Wilderness designation would provide additional protection to these resources. Other effects due to changes in management are discussed below.

MEXICAN MOUNTAIN WSA

AIR QUALITY

Significant impacts to air quality would not occur because major developments are unlikely. The rocky nature of much of the WSA and disturbance of only 70 acres would result in increases in fugitive dust emissions; thus, the area would retain its Class II air quality classification and meet the standards in accordance with the Clean Air Act Amendments.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities. Soil loss on 70 acres would increase from 25 cubic yards/year to 126 cubic yards/year. However, soil loss would decrease as reclamation occurred. The time for complete reclamation cannot be determined. Therefore, with this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 101 cubic yards (.5 percent), as compared to 2,552 cubic yards (12 percent) for the No Action Alternative.

VEGETATION

Additional access and disturbance in the WSA due to exploration and development of mining claims would be only 70 acres as compared to 1,760 acres with the No Action Alternative. Disturbance of vegetation on the 70 acres would not be significant.

The threat of disturbance or collection of *Sclerocactus wrightiae* would not be significantly increased. Closure to ORV use would protect the habitat area for *Erigeron maguirei*. The exclusion of new mining claims and mineral leasing would help provide protection to the other proposed or candidate species. It is concluded that, with wilderness designation, these endangered or sensitive species would be less likely to receive inadvertent impacts than with the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact only 70 acres with this alternative. Because of the small area affected and the rocky soils on much of the WSA, there would be no significant change from the current situation and water resources would not be impacted. Development of potential dams and reservoirs on the San Rafael River would not be allowed and no resultant impacts to river flows or water quality would occur.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Designation of the Mexican Mountain WSA as wilderness would have an impact on the exploration for oil and gas. One pre-FLPMA lease (80 acres) could be developed under prior existing rights. Post-FLPMA leases (35,192 acres) would be subject to wilderness protection stipulations and likely would not be further explored or developed. As leases expire, they would not be reviewed and any undiscovered oil and gas reserves would not be identified or placed in production. Potential of the area, however, is low, with less than 3 million barrels of oil or 18 billion cubic feet of natural gas estimated to be recoverable. The use of this potential resource, however, would be foregone. Since about one-third of the WSA would continue to be closed to leasing with the No Action Alternative, only two-thirds of the recoverable oil and gas would be foregone as a result of wilderness designation. Because of the estimated low quantities and uncertainty of a produceable resource, the probability that production would be foregone is low.

Tar Sand

The potential for the occurrence of tar sand within the WSA is high for small to moderate deposits. SAI (1982) estimates that between 10 and 500 million barrels of oil from tar sand exist in the WSA, of which about 150 million barrels could be recovered. BLM estimates that about 100 million barrels of in-place oil exists in the WSA; of that amount, 30 million barrels are considered potentially recoverable by in-situ methods. With wilderness designation, tar sand resources in the WSA would not be leased. Thus, exploration and development would not occur in these areas and any recoverable potential of tar sand would be foregone. Present information, however, does not suggest oil production from tar sand is likely in the WSA even with the No Action Alternative. Therefore, the All Wilderness Alternative would not affect expected use of the tar sand resource in the foreseeable future.

Geothermal

No geothermal leasing would occur, but this would not be significant due to low potential for this resource.

Potash

The potash-bearing rocks in the WSA are expected to be low grade, thin, deep, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and

MEXICAN MOUNTAIN WSA

more shallow deposits elsewhere. With this alternative, the WSA would not be leased for potash and it is assumed that less than 750,000 tons of potentially recoverable potash would be foregone. This would not be significant due to the extensive potash resources elsewhere in the region and a low probability of development within the WSA.

Hydropower

Due to the presence of the San Rafael River, the WSA was evaluated for hydroelectric power. There are two possible damsites; however, no plans to use the sites for power generation are known. Potential for future power generation (15 megawatts) could be foregone, but this is not considered significant due to the lack of interest, small size, and land management considerations.

Locatable Minerals

Uranium and Associated Minerals

There are 176 mining claims covering 2,350 acres (4 percent) of the WSA. Claims located prior to wilderness designation could continue to be worked in accordance with valid rights existing at the time of wilderness designation, but operations would be regulated under unnecessary or undue degradation guidelines. Claims would be subject to a validity exam, and those not current in assessment or not showing a valid discovery would be declared null and void.

Uranium/vanadium-bearing strata are known to occur in the WSA; however, the ore bodies are thought to be small to moderate in size, scattered, and mainly subsurface.

If minerals are located prior to wilderness designation, it is estimated that up to 70 acres could be disturbed due to exploration and development of the locatable mineral resources, primarily uranium and manganese. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed before designation. In that case, the potential for recovery of 500 to 1,000 tons of uranium, less than 50,000 tons of copper, and 100,000 tons of 40-percent manganese would be foregone. Other minerals that may be associated with uranium (such as zinc, lead, and silver) could also be foregone, although the likelihood is low for these to be present in significant amounts. Gypsum and sulphur potential also is low and would be foregone. After designation all lands not under claim (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981).

Because production of these minerals is not

currently occurring and economic considerations are unfavorable, it is unlikely that exploration or development would occur in the foreseeable future, even without wilderness designation. Therefore, this alternative would probably not result in any significant loss of recoverable uranium and associated mineral resources.

Salable Minerals

Wilderness designation would not affect use of salable minerals since no use of these materials from the WSA is predicted.

WILDLIFE

Wildlife species, particularly those sensitive to surface disturbance and human interference, would benefit through protection of habitat.

Raptor nesting along cliffs adjacent to heavily used vehicle routes near the west portion of the WSA would continue to be affected by human activities. The 31,700 acres of peregrine falcon nesting habitat and 59,460 acres of raptor nesting habitat in the WSA would be protected from the establishment of additional vehicle routes. Surface-disturbing activities would be limited to about 70 acres. Limitations on surface disturbance would avoid abandonment of nests and discouragement of future nesting. Twelve known falcon nests and three known golden eagle nests would be within the designated wilderness.

Five small spring developments and one catchment proposed for bighorn sheep would require construction in a manner not impairing to wilderness values. This would improve distribution, and bighorn sheep populations ultimately would be expected to expand from 12 up to about 387 animals due to habitat protection afforded over the 59,460 acres of range within the area designated.

There are no proposed wildlife or vegetation treatment projects for the WSA; therefore, habitat conditions would remain in a natural state, except on the 70 acres of disturbed areas.

Wildlife habitat generally would be protected; however, increases in recreation visitor use could have a small negative impact on wildlife although visitor/wildlife encounters would be infrequent due to low wildlife populations. Mining claim development projected for 70 acres could have a disruptive effect on a few animals but would not significantly affect overall wildlife conditions in the WSA.

LIVESTOCK AND WILD BURROS

Present domestic livestock grazing would continue as authorized in the San Rafael and Price

MEXICAN MOUNTAIN WSA

River MFPs. The 1,809 AUMs of forage currently allocated in the WSA would remain available. Existing developments (two reservoirs and two short allotment boundary fences) would be used and maintained in the same manner as the past based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that wilderness protection standards are met. Motorized vehicle use for managing livestock along the way into Mexican Bend could be limited if found impractical or unreasonable; however, wilderness designation would have no impact on the existing level of livestock use or livestock management practices.

The herd of wild burros would continue to use the area.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. With this alternative, the potential for surface-disturbing activities that could impair visual quality would be limited through management under VRM Class I, which generally allows for only natural ecological change.

The possible disturbance of 70 acres related to the development of valid mining claims could occur. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on localized, disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. If roads for development of valid mining claims were required in highly visible locations (worst-case analysis), VRM Class I objectives might not be met on a large portion of the WSA. Because the potential for development of mining claims is low, visual quality would probably not be reduced in the WSA as a whole.

RECREATION

The entire 59,600 acres would be closed to recreational ORV use. Some unauthorized ORV use, however, could be expected to continue in well established use areas since practical management options to limit some of this use might not exist. About 20 miles of four-wheel drive trails would be closed. Traditional motorcycle use areas south of the San Rafael Bridge Campground and along Indian Bench would also be closed. Areas outside of the WSA, west of Red Canyon and

south of the WSA, also are proposed for closure as per the San Rafael MFP; however, these areas have not been designated closed and may still be available for ORV use. About 900 of the 1,000 visitor days associated with ORV and other vehicle-related recreation would be foregone.

The "cherry-stemmed" road along Indian Bench would continue to be available to vehicles.

If roads for the development of valid mining claims were required, the quality of primitive recreational opportunities would be reduced; however, because the potential for mineral production is low, the quality of the primitive recreational experience likely would remain high. By increasing public awareness of the area, designation could result in increased primitive recreation use of the WSA. Judging from the WSA's site characteristics, population distribution about the site, and availability of similar sites, use would increase from the present 1,500 to an estimated 8,940 visitor days/year. The nature of the use would change from about 33 percent primitive use and 67 percent ORV use at present to almost 100 percent primitive recreation use.

WILDERNESS VALUES

Wilderness designation would contribute to the preservation of the area's wilderness characteristics. The potential for surface-disturbing activities (70 acres) that could impair wilderness values would be limited through management under VRM Class I (generally allowing for only natural ecological change), through continuation of an ORV closure, through closure of the entire area to future mineral leasing and location, and through prevention of future hydroelectric projects, if proposed.

The configuration of the WSA east of Red Canyon would be difficult to manage as wilderness because it is comprised of two strips of land ranging in width from 0.25 to 3 miles. These are separated by a strip of land not within the WSA, that ranges in width from 0.5 to 1.5 miles. This total area receives significant amounts of ORV use.

Wilderness designation would help protect naturalness within the 59,600-acre WSA. Outstanding opportunities for solitude would be preserved and topographic and vegetation screening would remain substantially unaltered on about 80 percent of the WSA. Solitude in the western part of the WSA could continue to be affected by off-site influences. Areas along the "cherry-stemmed" San Rafael River road would continue to be influenced by vehicle use, as would areas south of

MEXICAN MOUNTAIN WSA

the San Rafael Bridge Campground, Window Blind Peak, and Assembly Hall Peak. The canyon wall area between roads in Buckhorn Draw and along the San Rafael River and the traveled way in Prickly Pear Flat would also be influenced by vehicle use. The configuration of this portion of the WSA is such that it includes only canyon wall and narrow bench areas above the canyons. Areas along the "cherry-stemmed" road, south of the San Rafael Bridge Campground, and along the canyon walls between Buckhorn Draw and Red Canyon are estimated to include about 12,000 acres. They are comprised of areas where vehicle uses often adversely affect the ability to find a secluded spot. Opportunities for solitude are not considered outstanding in 6,000 of these 12,000 acres, while 6,000 acres meet the outstanding criterion.

Wilderness designation would emphasize and protect primitive recreation values. Visitation to the area for primitive recreation would be expected to increase to up to 8,940 visitor days per year. The size of the WSA could accommodate this increase in use without degradation of the wilderness experience, although some loss of solitude could occur in the canyon area on peak-use days. The major part of visitor use would be expected to be for hiking, tubing and camping.

Special features associated with wilderness uses would benefit by designation. Established habitat for species sensitive to development would be protected, increasing the probability of wildlife sightings. Scenic values would be preserved by excluding impairing surface-disturbing activities. Known, undiscovered, or undocumented cultural sites of recreational interest would be protected over at least 59,530 acres. About 70 acres of disturbance that could affect cultural sites is estimated; however, the likelihood of this occurring is low.

LAND USE PLANS AND CONTROLS

This alternative would be consistent with wildlife management efforts by the State of Utah (UDWR). Although it would not be consistent with the Emery County zoning objectives for mining development, it would not conflict with the livestock grazing aspects of the Emery County plan. The option of National Park status for the WSA as being considered by the Emery County Economic Development Council would remain open and the park values of the WSA would be protected by designation. Opportunity for development of hydropower sites in the WSA would be foregone.

The existing BLM San Rafael and Price River MFPs do not address wilderness designation.

Congressional designation of the WSA as wilderness would be an amendment to the BLM land use plans.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

For the most favorable minerals, the WSA is rated as having a high certainty that moderate-sized uranium and tar sand deposits are present. There is a low potential for small copper, potash, and oil and gas deposits. The WSA also has potential to produce moderate amounts of hydroelectric power and a low potential for a small geothermal area. Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low in the foreseeable future, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims or income would be lost. Future mineral-related employment foregone with designation is not expected to significantly affect local economic growth. However, local economic impact estimates are speculative because the presence of mineral resources and the future economic and technological conditions are uncertain.

Present grazing levels would be allowed and added restrictions would not be such as to prevent the maintenance and replacement of rangeland improvements. New rangeland improvements would only be allowed if primarily for the purposes of resource protection and management. Therefore, economically feasible improvements designed primarily for livestock (none now proposed) could be foregone with designation, along with any possible increase in ranchers' income. Livestock use and ranchers' income would continue as at present with \$36,180 annually of livestock sales and \$9,045 of ranchers' returns to labor and investment. Federal grazing fee revenues of about \$2,533 (at \$1.40 per AUM) would continue.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section).

Related local expenditures would be small (average of \$4.10 per visitor day statewide), but could increase from \$6,150 to about \$36,654 for a net increase of \$30,504 per year. These expenditures would be well distributed among businesses in the affected area and would be locally insignificant. The elimination of recreational ORV travel in the WSA would reduce related local expenditures. However, these reduced expenditures would be small, well distributed among businesses in the affected area, and locally insignificant.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 35,272 acres now leased would cause an eventual loss of \$105,816 per year to the Federal Treasury. The closure of 3,528 acres potentially available for lease would cause a potential loss of \$10,584 per year to the Federal Treasury. In each case, without designation, the State would have received half of these revenues.

Partial Wilderness Alternative (46,750 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 46,750-acre area designated as wilderness and the 12,850-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some of the existing mining claims would eventually be explored and developed causing an estimated 50 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities and that competitive tar sand leasing would be denied. Oil and gas leases would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed. Hydroelectric development would not take place at either of the two sites identified in the WSA.

It is assumed that, within the nondesignated area, 200 acres would be disturbed sometime in the future due to energy and mineral development. Overall, 250 acres of surface disturbance would occur within the WSA, 1,510 acres less than under the No Action Alternative and 180 acres more than with the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 1,760 acres of surface disturbance, would not significantly affect geology, forest resources, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes a total of 250 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same types of impacts on development of water sources, mineral and energy resources, wildlife, livestock grazing, wild horses/burros, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

SOILS

It is estimated that up to 250 acres of soil could be disturbed by mineral exploration and development. Of that, 50 acres would be within the designated portion and 200 acres would be in the nondesignated area. The average annual rate of soil loss would increase from 0.35 to 1.8 cubic yards/acre; therefore, the soil loss on the 50 acres within the designated wilderness would increase from 18 cubic yards/year to 90 cubic yards/year. Within the nondesignated area, soil loss on 200 acres would increase from 70 cubic yards/year to 360 cubic yards/year. Soil loss would decrease in these disturbed areas as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with the Partial Wilderness Alternative, maximum annual soil loss within the designated portion would increase by approximately 72 cubic yards over current annual soil loss. Maximum annual soil loss within the nondesignated portion would increase by approximately 290 cubic yards over current annual soil loss. Together it would total about 362 cubic yards per year. The likelihood of this occurring is low because 60 percent of the WSA is rock outcrop or rubble and the soils subject to severe or critical erosion tend to occur as pockets of fine sandy soil and can be avoided. Also, the estimated surface disturbance for either the designated or nondesignated portions is not expected to fully occur due to low mineral potential and little development interest in the area.

VEGETATION

Except for a possible 50 acres, vegetation in the 46,750-acre wilderness would remain undisturbed. About 200 acres of vegetation could be altered and additional access would become established

in the 12,850 acres of the WSA not designated. This could increase the threat to *Sclerocactus wrightiae*. The area not designated includes the one known site for this sensitive plant. Also in the undesignated area, ORV use could eventually become established into the habitat area for *Erigeron maguirei* due to its proximity to Buckhorn Draw. If this occurred, soil compaction or crushing of the plant could occur. Some physical plant damage and soil compaction could occur in areas not designated and inadvertent loss of individual plants of six candidate or proposed plant species could result. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and informally consult with the FWS as required by BLM policy. If any threatened or endangered species could be affected, BLM would initiate formal Section 7 consultation with the FWS under provisions of the Endangered Species Act. Appropriate mitigating measures would be applied. Because necessary measures would be taken to protect these plants, if found, it can reasonably be concluded that the viability of populations of threatened, endangered, or sensitive species would be protected.

Mining or mineral exploration could adversely affect plant communities where activity occurs. This is most likely to be associated with mining claim assessment along Indian Bench or at Mexican Bend. Within the designated portion it is estimated that 50 acres of surface disturbance could occur. Overall, it is concluded that impacts to vegetation would be insignificant.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Most erosion in the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development within the designated portion could impact 50 acres, with a soil loss increase of approximately 72 cubic yards/year. Within the nondesignated portion, an increase of about 290 cubic yards/year of soil loss could occur. Due to rocky conditions in 60 percent of the area and isolated pockets of erodible soil, erosion would not contribute substantial additional sediment to the San Rafael River, and the impact to water resources for either portion of the WSA in this alternative would not be significant.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Within the designated portion of the WSA, exploration activities for oil and gas would be impacted. Post-FLPMA leases (about 25,400 acres) would continue to be subject to wilderness stipulations. No new leases would be issued in the designated portion and, as leases expire, opportunities for oil and gas exploration would cease and any undiscovered reserves would not be produced. Potential of the designated area, however, is low, with 2 million barrels of oil and 13 billion cubic feet of natural gas estimated as recoverable. About 42 percent of the designated portion is already in Category 4 (closed to leasing). Therefore, only about 1 million barrels of oil or up to 7 billion cubic feet of gas would be considered foregone as a result of wilderness designation: this is not considered significant.

Within the nondesignated portion of the WSA, oil and gas categories would remain the same (i.e., 9,770 acres in Category 1; 1,110 acres in Category 2; 900 acres in Category 3; and 1,070 acres in Category 4). In this area, wilderness stipulations on post-FLPMA leases would be removed and the potential 1 million barrels of recoverable gas and 5 billion cubic feet of recoverable natural gas could be explored or developed without concern for wilderness values. However, due to the low potential of the area, rugged terrain, and management restrictions, indications are that development in the undesignated portion would be unlikely.

Tar Sand

No tar sand leases exist within the WSA. Within the designated portion of the WSA, approximately 78 million barrels of tar sand may exist, with about 23.5 million barrels considered recoverable. The portion of the San Rafael Swell STSA within the WSA could not be leased under this alternative; thus, exploration and development would not occur in the designated area.

Within the nondesignated portion of the WSA, approximately 22 million barrels of tar sand exist, with about 6.5 million barrels considered recoverable. This resource could be developed without concern for wilderness values.

With this alternative, significant effects on tar sand development are not expected due to low potential for development, irrespective of wilderness considerations.

MEXICAN MOUNTAIN WSA

Geothermal

Due to low potential, no impacts to use of geothermal resources are predicted.

Potash

The potash-bearing rocks in the WSA are expected to be low grade, thin, and discontinuous. The likelihood of the area being explored or developed is remote due to thicker, richer, and more shallow deposits elsewhere.

It is assumed that there is less than 750,000 tons of recoverable potash. Within the designated portion of the WSA, an estimated 80 percent of this potash could not be explored or developed. Within the nondesignated portion, about 20 percent of the potash could be explored and developed under current lease categories and restrictions.

Hydropower

Due to the presence of the San Rafael River, the WSA was evaluated for hydroelectric power. The two possible damsites would remain in the designated wilderness; however, no plans to use these sites for power generation are known. Potential for future power generation would be foregone. As noted for the All Wilderness Alternative, this probably would not be significant.

Locatable Minerals

Uranium and Associated Minerals

Existing mining claims are not likely to be developed since most claims are not on or over known favorable uranium-bearing rocks and most surface outcrops are thought to have been previously located and explored. Within the designated area, 67 mining claims cover 910 acres. Present uranium markets are depressed, and future exploration and/or production is more likely to occur in more favorable areas to the south in the San Rafael Swell. Other known mineral deposits (i.e., copper, manganese, etc.) are not likely to be economically producible, given their extent, quality, and location. Locatable minerals, if present in favorable amounts, grades, and locations, would be foregone.

In the nondesignated portion, 109 mining claims covering 1,440 acres could be worked without consideration for wilderness values, and locatable minerals, if present, would not be foregone.

Salable Minerals

No use of these materials is expected with the No Action Alternative; therefore, no impacts would occur with the Partial Wilderness Alternative.

WILDLIFE

Wildlife species, particularly those sensitive to human interference and surface disturbance, would benefit through protection of habitat. The carrying capacity would not be as great as with the All Wilderness Alternative due to an estimated 250 acres of disturbance and possible human encroachment on the 12,850 nondesignated areas.

Of the 56,150 acres of bighorn sheep habitat within the WSA, up to 1,000 could become unsuitable because of development and encroachment of humans. This is expected to occur mainly in the western portion of the WSA. Bighorn sheep populations would be expected to increase from the present population of 12, although carrying capacity would be reduced from 387 to 380.

Raptor nesting could also be affected. Up to 1,000 acres of peregrine falcon and other raptor nesting habitat could be adversely affected by concentrated vehicle use and/or surface-disturbing activity. Peregrine falcon habitat could be reduced from 31,700 acres to about 30,700 acres, while general raptor habitat could be reduced from 59,600 to 58,360 acres. In areas of suitable habitat, the abandonment of nests and discouragement of future nesting would occur. Eleven known falcon nests and two known golden eagle nests would be within the designated wilderness. Other known nests are not likely to be affected due to their locations.

LIVESTOCK AND WILD BURROS

Partial wilderness designation would affect domestic livestock grazing essentially the same as the All Wilderness Alternative. Of the 1,809 AUMs allocated in the WSA, 1,123 would be within the designated portion and 686 within the nondesignated portion. Development of future roads or other livestock management facilities for use with 1,123 AUMs in the designated portion could be restricted to preserve wilderness values. The way to Mexican Bend could also be restricted in terms of frequency of motorized travel.

In the 12,850-acre nonwilderness area, livestock grazing would be allowed without wilderness considerations.

The wild burros within the WSA would continue to be allowed.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual quality. Within the designated portion, the potential for surface-

MEXICAN MOUNTAIN WSA

disturbing activities (50 acres) that could impair visual quality would be limited through management under VRM Class I, which generally allows for only natural ecological change.

Within the designated portion, the possible disturbance of 50 acres could occur in the form of roads and mining sites. Although mitigating measures would be applied to reduce visual contrast, the visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. Exploration and development of locatable minerals are not considered likely.

Within the nondesignated area, VRM Class II and III objectives would be applied to impacts from surface-disturbing activities (200 acres). Although mitigating measures would be applied to reduce visual contrasts, the visual quality would be degraded and VRM Class II and III objectives would not be met during the short term. Even after rehabilitation, some permanent localized degradation could be expected. If roads, drill pads, and in-situ tar sand extraction sites are located in the nondesignated area (worst-case analysis), visual quality could be significantly reduced in that area. This magnitude of disturbance, however, is unlikely.

RECREATION

Primitive recreation would not increase as much as under the All Wilderness Alternative. Areas presently receiving most of the primitive recreation use would be designated wilderness. Total primitive use levels would be expected to increase up to 6,440 visitor days/year.

Present ORV use could continue and expand in those areas not designated wilderness. Traditional use areas would remain open to ORV use. No ORV trails (20 miles) would be closed south of San Rafael Bridge Campground, on Indian Bench, at Mexican Bend, or to Swasey's Leap and approximately 1,000 visitor days per year related to ORV use would continue and could increase to 1,490 visitor days/year in the future.

With primitive use in the designated part and ORV activities in the remaining part, recreation use in the WSA would total about 7,930 visitor days/year.

WILDERNESS VALUES

With this alternative, 46,750 acres would be designated wilderness and 12,850 acres would not.

Wilderness values would benefit from the exclusion of future surface disturbance that might

occur in the designated portion. The naturalness of the designated wilderness would be emphasized by omission of about 12,000 acres along 20 miles of established ORV trails and in established vehicle use areas.

It is estimated that 50 acres of additional surface disturbance could occur from mineral exploration and development; however, as discussed under the All Wilderness and No Action Alternatives, it is unlikely that these activities would actually occur. Therefore, naturalness in the designated portion would be preserved.

The naturalness of the area not designated could be negatively affected. Even though 200 acres of disturbance from energy and mineral exploration and development are considered unlikely, traditional ORV use would continue in areas already impacted and additional ORV areas (now considered in natural condition) could become established.

Outstanding opportunities for solitude would be preserved within the designated wilderness. The entire designated wilderness (46,750 acres) would meet the outstanding solitude criterion. Topographic and vegetation screening in the designated wilderness would be unaltered. Vegetation screening in pinyon-juniper areas outside the designated area could be altered by up to 200 acres of surface disturbance. Areas where solitude is now less than outstanding due to the influence of vehicle use would not be included in the designated wilderness.

Visitation for primitive recreation in the area would be expected to increase up to about 6,440 visitor days/year. The major part of the visitor use would be expected to be for hiking, tubing, and camping. Recreation opportunities which meet the outstanding criterion would be preserved in the designated wilderness (46,750 acres). As with the All Wilderness Alternative, the area would be large enough to accommodate this increased use, except high use in canyon areas on peak days could detract somewhat from the wilderness experience.

Special features identified for the WSA would largely be preserved. Some activities or impacts could occur that might affect wildlife sightings. Scenic values would be preserved in the designated wilderness by excluding most surface disturbance. Cultural sites (whether known, undiscovered, or undocumented at this time) of recreational interest within the designated wilderness would also be protected from surface disturbance.

LAND USE PLANS AND CONTROLS

This alternative would relate to the Land Use Plans and Controls section for the All Wilderness Alternative on 46,750 acres, and the No Action Alternative on 12,850 acres. The potential reservoirs could not be built.

SOCIOECONOMICS

With this alternative, there would be no significant changes in current trends of population, employment, and local income distribution.

In the 46,750-acre designated area, valid mining claims could be continued but new claims would not be located. In the 12,850-acre nondesignated area, both existing and new claims would occur. This alternative would not cause a reduction in local income from existing claims (as shown in Table 11) and there could be up to about a 20-percent increase if new claims are located in the nondesignated area.

Existing local income of \$36,180 resulting from 1,809 AUMs of forage would continue. There

would be no future livestock-related impacts in the Calf Canyon and North Sinbad Allotments because the ability to maintain, replace and build new range improvements would remain. Other allotments would be affected as with the All Wilderness Alternative. The existing grazing fee revenues would not be foregone.

Nonmotorized recreation use and related local expenditures might not increase as much as with the All Wilderness Alternative; however, there would be no loss in ORV travel-related local expenditures. Income related to recreation with this alternative is estimated to be \$32,513, about \$4,141 less than predicted with the All Wilderness Alternative.

Because of the reduced lease acreage within the wilderness boundaries, the loss and potential loss of Federal oil and gas lease revenues would be about 20 percent (35,340 acres) less than with the All Wilderness Alternative. Loss of existing leases that would expire within the designated area and potential leases would result in about \$81,060 in lease fee revenues foregone.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Council on Environmental Quality. 1980. "Inter-agency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory" (personal communication). August 10, 1980. Washington, D.C.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1984. *Stockpile Report to the Congress*. September 1984. U.S. Government Printing Office, Washington, D.C.
- Hall. 1982. *The Hiker's Guide to Utah*. Falcon Press Publishing Company, Inc. Billings and Helena, Montana.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin: Geology of the Paradox Basin." *Rocky Mountain Association of Geologists*, Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.

MEXICAN MOUNTAIN WSA

- U.S. Department of the Interior, Bureau of Land Management. 1979a. "San Rafael Resource Area Unit Resource Analysis and Management Framework Plan" (unpublished documents). San Rafael Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1982c. "Price River Resource Area Unit Resource Analysis" (unpublished document). December 1982. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1983. "Price River Resource Area Management Framework Plan" (unpublished document). December 1983. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984c. *Utah Combined Hydrocarbon Leasing Land Use Plan Amendments and New Lease Tracts Record of Decision*. October 1984. Utah State Office, Salt Lake City, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (Map). Reston, Virginia.
- U.S. Department of the Interior, Geological Survey. 1982. "Designated Tar Sand, San Rafael Swell Special Tar Sand Area." *Federal Register* Notice. November 5, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. Washington, D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Division of Wildlife Resources. 1977. "Endangered Species Inventory" (unpublished document). April 1977. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary

MEXICAN MOUNTAIN WSA

of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Welsh, S. L. 1982. *Illustrated Manual of Proposed*

Threatened and Endangered Plants of Utah. Prepared in cooperation with the U.S. Department of the Interior, Fish and Wildlife Service and Bureau of Land Management and the U.S. Department of Agriculture, Forest Service. U.S. Government Printing Office, Washington, D.C.

Jack Canyon WSA



JACK CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative (Proposed Action)	2
All Wilderness Alternative	4
Summary of Environmental Consequences	6
AFFECTED ENVIRONMENT	9
Air Quality	9
Geology	9
Soils	9
Vegetation	10
Water Resources	11
Mineral and Energy Resources	11
Wildlife	14
Forest Resources	15
Livestock and Wild Horses/Burros	15
Visual Resources	16
Cultural Resources	16
Recreation	16
Wilderness Values	17
Land Use Plans and Controls	18
Socioeconomics	19
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	20
Analysis Assumptions and Guidelines for All Alternatives	20
No Action Alternative (Proposed Action)	20
All Wilderness Alternative	25
BIBLIOGRAPHY	29

JACK CANYON WSA

(UT-060-068C)

INTRODUCTION

General Description of the Area

Jack Canyon Wilderness Study Area (WSA) consists of 7,500 acres of BLM-administered land in Carbon County about 15 miles northeast of East Carbon City and Sunnyside, Utah. The area is in the rugged West Tavaputs Plateau of the Book Cliffs/Roan Cliffs region. The WSA is about 6 miles long, northeast to southwest, and about 4 miles wide, northwest to southeast. It includes the multi-forked canyon drainages of Pine Spring Draw and Upper Jack Creek. It is separated from the Desolation Canyon WSA by the Cedar Ridge road and a pipeline route.

Elevation in the WSA extends from about 5,200 feet in the bottom of the upper Jack Creek drainage to about 8,000 feet along Cedar Ridge. Climate ranges between semiarid and semihumid. Summer temperatures may reach 100 degrees Fahrenheit (F) in the canyon bottoms, while winter lows may dip to -25 degrees F on the higher rims. Depending on location, the average July high temperature ranges from 75 to 85 degrees F. The average January low temperature can be expected to reach 5 to 20 degrees F. Average annual precipitation ranges from 10 to 16 inches, roughly evenly divided between summer/fall thundershowers (5 to 7 inches) and winter snowfall (20 to 80 inches).

The WSA displays the characteristic highly dissected topography of the Roan Cliffs region of Utah. Surface features include segments of vertical-walled and steep V-shaped canyons in two principal drainages. Narrow, irregular ridges separate steep draws which rise to the north and south of the principal drainages. Vegetation varies among Douglas fir, pinyon-juniper, sagebrush, riparian, and rock outcrop types. Water is present throughout much of the WSA.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs are discussed in Volume I. Four specific issues pertaining to the Jack Canyon WSA were identified through formal public scoping and are discussed below:

1. *Comment:* Post-FLPMA (Federal Land Policy and Management Act) oil and gas exploration activities have degraded wilderness values; this degradation has been used

to exclude a portion of the WSA from suitable recommendation.

Response: The naturalness of about 2 percent of the WSA (150 acres) has been affected by development of pre-FLPMA oil and gas leases near the Cedar Ridge area. During scoping for this Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Volume I of this EIS.

2. *Comment:* The portion of Jack Canyon WSA adjacent to Desolation Canyon WSA should be recommended suitable for designation. Slant drilling could be used to preserve wilderness character.

Response: Refer to the previous response.

3. *Comment:* The acreage for some grazing allotments inside the WSA has been decreased in the amended Site-Specific Analysis (SSA). Is this a result of minor (unmentioned) boundary adjustments in the WSA or just a rounding-off of the acreage?



Response: The Jack Canyon WSA was created during the reinventory of Desolation Canyon WSA. The acreage has not been amended and the size identified for the grazing allotment within the WSA appears as originally given.

4. *Comment:* The oil and gas potential of the WSA is ranked moderate by Science Applications, Inc. (SAI, 1982) as modified by BLM. Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be moderate to high. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

A partial alternative was suggested during scoping to include that portion of the WSA immediately adjacent to Desolation Canyon. During early studies BLM endeavored to identify a realistic partial alternative; however, the WSA is not well suited to such an alternative due to limited size, influence of adjacent roads, an adjacent pipeline crossing, and terrain simplicity (i.e., a single major canyon). The Cedar Ridge road and an existing pipeline route separate the Jack Canyon WSA from the Desolation Canyon WSA, thereby preventing a combination of the two areas. A partial alternative within the Jack Canyon WSA would divide the single canyon/ridge system into an arbitrary configuration. Therefore, a partial alternative was not included for detailed study.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (7,500 acres).

Where management intentions have not been clearly identified, assumptions are made based on management projections for each alternative. These assumptions are indicated in each case.

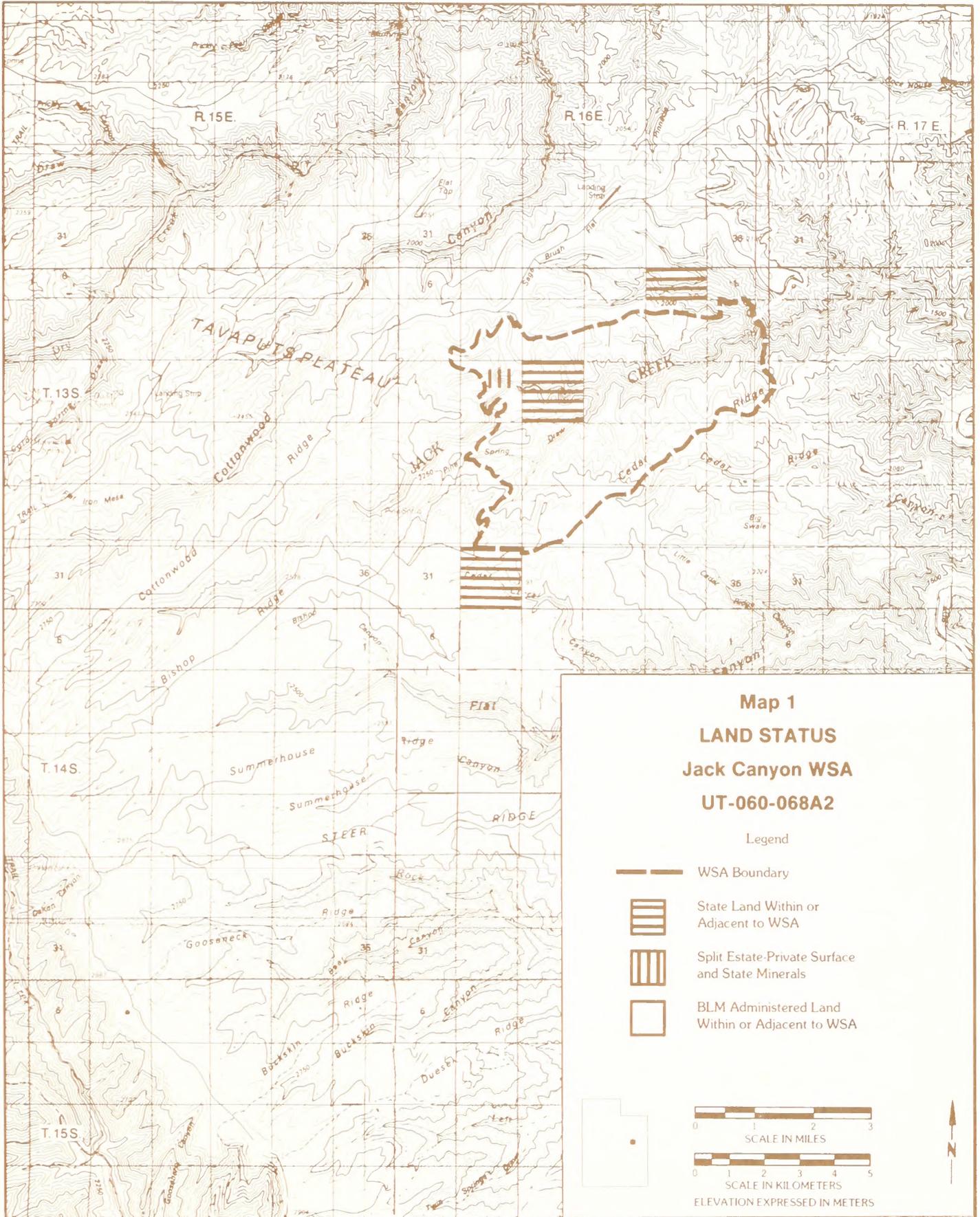
NO ACTION ALTERNATIVE (PROPOSED ACTION)

With this alternative, none of the 7,500-acre Jack Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed for multiple uses in accordance with the general provisions of the Price River Management Framework Plan (MFP) (USDI, BLM, 1983b). One section of State land (640 acres) and 1/16 section of private land (40 acres) with State-owned minerals (split-estate) within the WSA (refer to Map 1) have not been identified in the MFP for special Federal acquisition through exchange or purchase. State and private lands are analyzed in this alternative as remaining under current ownership.

The following are specific actions that would take place under this alternative:

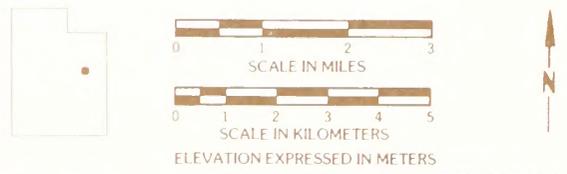
- All 7,500 acres would remain closed to mineral location due to an oil shale withdrawal that restricts any mining claim location. Existing oil and gas leases could be developed under Category 1 (standard stipulations) on 5,260 acres and new leases could be issued under Category 2 (standard and special stipulations) on 2,240 acres (and/or on other lands in the WSA where existing leases may expire) without concern for wilderness values. The special stipulations would restrict use to protect watershed conditions. Future leases for coal, oil shale, and combined hydrocarbons (tar sand) could be considered, although the potential appears low. Building stone permits could be issued on a 600-acre area within the WSA.
- Domestic livestock grazing use of the Jack Canyon WSA would continue as authorized in the Price River MFP (currently 216 Animal Unit Months [AUMs]). There are no existing range developments but new range developments could be implemented without wilderness considerations. A potential 940-acre chaining-and-seeding project has been identified. About 1,300 acres of the WSA could continue to be used by the Range Creek wild horse herd of about 25 animals.
- Development of facilities and improvements for wildlife, water resources, etc.

JACK CANYON WSA



Map 1
LAND STATUS
Jack Canyon WSA
UT-060-068A2

- Legend
-  WSA Boundary
 -  State Land Within or Adjacent to WSA
 -  Split Estate-Private Surface and State Minerals
 -  BLM Administered Land Within or Adjacent to WSA



could be allowed if in conformance with the BLM planning documents. None are now planned.

- The entire WSA acreage would continue to be open to off-road vehicle (ORV) use, although existing use is rare, except on roads bordering the WSA. About 1.5 miles of existing abandoned ways extending into the WSA in three locations along the northern boundary could be used again in the future. A 0.75-mile road leading to a drill site north of Cedar Ridge road would also remain open to vehicular use. Pipeline rights-of-way could be issued if needed for oil and gas development.
- The entire 7,500-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned. Opportunities are limited due to remoteness, steep terrain, and poor accessibility.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (change not visually evident) on 6,400 acres, Class III (change evident but usually subordinate) on 400 acres, and Class IV (changes evident but visually integrated) on 700 acres.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

With this alternative, all 7,500 acres of the Jack Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character. After

designation, one section (640 acres) of State land and 40 acres of State minerals (split estate) within the WSA (refer to Map 1) could be transferred to Federal ownership by purchase or exchange. The 40 acres of private surface within the WSA and two sections of State land adjacent to the WSA would not be exchanged. (Refer to Volume I for a further discussion of State land.) The figures and acreages given for this alternative are for Federal lands only.

The following are specific actions that would be taken with this alternative:

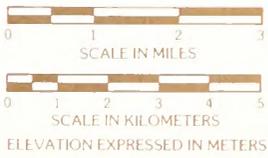
- After wilderness designation, all 7,500 acres would be closed to new mineral leasing and sale. There are no existing mining claims in the WSA and the WSA would continue to be withdrawn from mineral location. Existing oil and gas leases not held by existing production in the Peters Point Unit (about 3,920 acres) would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. Some finds might be expected to occur outside the Peters Point Unit but within the Greater Jack Canyon Known Geologic Structure (KGS) which extends into the WSA. Any development on these leases could not cause significant adverse impacts to the area's wilderness character. Development and production from leases within the Peters Point Unit is expected to continue and would be allowed (under provisions of prior and existing rights) until oil and gas resources are depleted. At that time reclamation would be carried out. No new oil and gas, coal, oil shale, or combined hydrocarbon (tar sand) leases would be issued. Removal of building stone from 600 acres would be prohibited.
- Present domestic livestock grazing would continue as authorized in the Price River MFP and related BLM plans. The 216 AUMs in the WSA would remain available to livestock as presently allotted. No range developments now exist. New range developments would be allowed on a case-by-case basis if necessary for resource protection (range and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. The potential 940-acre chaining-and-seeding project would not be allowed. The existing use of 1,300 acres in the WSA by about 25 wild horses would be allowed to continue.

JACK CANYON WSA



Map 2
ALL WILDERNESS ALTERNATIVE
Jack Canyon WSA
UT-060-068A2

Legend
All Wilderness
Alternative (7,500 acres)



JACK CANYON WSA

- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). None are now proposed.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA and none are specifically planned, other than the chaining-and-seeding project noted in the livestock discussion above.
- The entire 7,500-acre area would be closed to ORV use except for: (1) users with valid existing rights, if approved by BLM in accordance with 43 Code of Federal Regulations (CFR) provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Three old vehicular ways totaling about 1.5 miles would be closed. A 0.75-mile road north of Cedar Ridge road would remain open to vehicular travel for the life of an associated oil and gas well. Limited road access to the 40-acre private land in-holding would be allowed as required in the future. About 18 miles of road or jeep trail bordering the WSA would remain open to vehicle use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 7,500-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- No pipeline rights-of-way would be issued except as may be related to pre-FLPMA oil and gas leases.
- Harvest of forest products would not be allowed except for noncommercial harvest of pinyon nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means. There is no harvest of forest products at the

present time, nor is any specifically planned.

- Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to aerial or hand techniques.
- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alterna-

JACK CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
JACK CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (7,500 Acres)
Geology	Disturbance of up to 1,500 acres, including subsurface effects from future tar sand development, could result in settling of the surface and possible fracturing. Some of the 12 springs in the WSA could be affected.	The effects described under the No Action Alternative would not occur. Disturbance of up to 30 acres due to oil and gas activities would not impact geology.
Soils	Mineral-related surface disturbance could increase annual soil loss in the WSA by up to 8,490 cubic yards above the estimated current soil loss of 6,750 cubic yards. Some stabilization would result from the proposed land treatment.	Annual soil loss of an additional 170 cubic yards could result from 30 acres of disturbance.
Mineral and Energy Resources	Potential recovery could continue for up to 18 billion cubic feet of natural gas. Although likelihood of development is low, up to 3 million barrels of oil, 27 million barrels of shale oil from oil shale, and 10 million barrels of oil from tar sand may be recovered in the long term.	An estimated 3 billion cubic feet of gas and 0.5 million barrels of oil could be recovered on 1,340 acres of leases held by production. Oil shale and tar sand would not be recovered but, due to the comparatively low volumes, the loss of development opportunity would not be significant.
Wildlife	About 20 percent of the WSA would be disturbed by mineral and energy development, which could adversely affect wildlife habitat. Wildlife would benefit in the long term from the proposed land treatment on 12.5 percent of the WSA.	Wildlife would benefit from solitude. The proposed land treatment would not be allowed, but reduced disturbance could allow the bighorn sheep population to increase by up to 28 animals and the elk population to increase by 23.
Livestock	Grazing of 216 AUMs would continue. There are no proposed developments. A proposed 940-acre vegetation treatment could be implemented for an increase of 85 AUMs.	Grazing of 216 AUMs would continue. Little effect on grazing management is expected. Proposed new developments (such as the vegetation treatment project) would not be allowed, and associated AUMs would be foregone.
Visual Resources	The quality of visual resources could be impaired on up to 1,500 acres disturbed and in surrounding areas. Much of the WSA could be impacted, either directly or indirectly.	Visual quality could be impaired on up to 30 acres. If this disturbance is distributed as roads and drill pads, visual resources in 20 to 30 percent of the WSA could be impacted.
Recreation	ORV use could continue on 1.5 miles of ways not currently used. Overall recreational use could increase from the present 100 visitor days to 149 over the next 20 years. Up to 1,500 acres of mineral-related disturbance and land treatment could reduce the quality of primitive recreation.	The WSA, including 1.5 miles of ways, would be closed to ORV use. A 0.75-mile road to an existing drill site would remain open. Recreational use could increase to up to 750 visitor days over the next 20 years due to publicity associated with wilderness values.

JACK CANYON WSA

**TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
JACK CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (7,500 Acres)
Wilderness Values	Wilderness values could be lost in most of the WSA. The values in the WSA would be directly impacted on 1,500 acres, but secondary impacts related to sights and sounds could adversely affect surrounding acreage.	Wilderness values would be protected, except on 30 acres (0.4 percent of the WSA) which may be disturbed by development of valid mineral rights. If disturbance is distributed throughout the leases, wilderness values on up to 20 to 30 percent of the WSA could be impacted.
Land Use Plans and Controls	This alternative would be consistent with State of Utah plans and policies and the current BLM Price River MFP. It would be consistent with multiple-use actions (such as grazing) noted in the <i>Carbon County Commission Zoning</i> , but in the long term might not fully achieve all of the protection objectives of the county plan.	This alternative would be consistent with Carbon County zoning, which addresses critical environment. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM Price River MFP.
Socio-economics	Annual local sales of less than \$4,730 and Federal revenues of up to \$16,083 (plus gas royalties) would continue. Additional forage from a land treatment might increase local benefits by up to \$1,700 and Federal grazing revenues by \$119. An additional \$6,720 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$4,730 and Federal revenues of up to \$303 would continue, but Federal revenues of up to \$18,480 from mineral leasing and local benefits and Federal receipts from additional grazing would be foregone. The opportunity for local economic benefits from possible future energy and mineral development would be reduced in the WSA.

tives are listed to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the Price River Resource Area Unit Resource Analysis (USDI, BLM, 1982c) and other BLM documents and files.

Air Quality

The WSA is in a Prevention of Significant Deterioration (PSD) Class II air quality attainment area under the 1977 Clean Air Act Amendments, and currently meets National Air Quality Standards. The nearest Class I areas are Arches National Monument (about 65 air miles south), Canyonlands National Park (about 80 air miles south), and the Colorado portion of Dinosaur National Monument (about 80 air miles northeast). Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River area, the Uinta Basin, and the Wasatch Front. Point sources in the vicinity include powerplants in Castle Valley and coal, oil, gas, and uranium exploration, production, and processing activities. Fugitive dust is the most significant air pollutant to the WSA and is intermittent depending on localized activities and winds. Visibility from ridge tops in the WSA usually remains good, ranging from 30 to 100 miles.

Geology

The WSA is in the Uinta Basin Section of the Colorado Plateau Physiographic Province. The WSA is on a large monocline dipping to the northeast at the southwest edge of the Uinta Basin. The WSA also is located on the southwest side of a fold (the Jack Canyon Anticline) associated with the Greater Jack Canyon KGS. Sedimentary rocks (strata) exposed at the surface represent about 2,500 feet of the Douglas, Parachute, and Evacuation Creek Members of the Green River Formation.

The Douglas Creek Member is composed mainly of sandstone, siltstone, shale, and limestone. The sandstone beds are composed mostly of fine- to medium-grained quartz and weather to gray and brown ledges. They are predominantly even-bedded, although some are cross-bedded. The siltstone is predominantly gray to tan and weathers to tan or reddish-brown ledges and steep slopes. The shale is gray, tan, and green and

weathers to green or gray slopes. Limestones of the WSA are thin-bedded to massive and are commonly gray. These limestones weather to distinct orange-brown ledges on many outcrops. This member is characterized by a rugged topography, displaying many cliffs and ledges dissected by numerous gullies. Features include buttresses, pinnacles, and windows.

The Parachute Creek Member is composed of interbedded marlstone, siltstone, sandstone, oil shale, and tuft. The Parachute Member is found at the higher elevations of the WSA, above the Douglas Creek Member. The member is composed mostly of gray and brown marlstone, siltstone, and sandstone deposited in a shallow-water environment. Strata are predominantly thin, even-bedded, and continuous. They are mainly less than 1 inch thick, with some oil shales being paper thin.

The Evacuation Creek Member, uppermost member of the Green River Formation, caps the higher elevations of the mesas bordering Jack Creek Canyon. The Horse Bench sandstone bed and associated resistant sandstones at the base of the member form the mesa caps. Sandstone beds are composed chiefly of very fine- to medium-grained quartz. Bedding is thin to massive and some units are cross-laminated and ripple marked. Grain size and thickness of bedding of the sandstones increase to the southwest. The sandstone beds are gray and brown and weather to gray and brown ledges and steep slopes. Thickness of the sandstones is about 100 feet.

The highly dissected topography of the WSA is representative of the Roan Cliffs region and results from (1) its position between the San Rafael Swell and the Uinta Basin; (2) the gradual uplift of the Colorado Plateau; and (3) climate and erosion over 40 to 50 million years. The landscape formed consists of incised, steep-walled (50= percent slope) canyons, separated by elongated mesas or ridges. Elevations range from 5,200 to 8,900 feet. The canyons tend to be near-vertical walled to the east becoming more V-shaped to the west. Rock outcrops through the canyons in massive rock walls and remnants, becoming more ledgy as tree cover and elevation increase to the west.

Soils

About 9 percent of the WSA is primarily rock outcrop with very steep slopes of between 50 and 75 percent. Steep slopes of 20 to 50 percent are also found in another 41 percent of the WSA. These steep to very steep slopes consist of moderately

JACK CANYON WSA

deep, stony soils. Another 49 percent of the WSA occupies sloping to moderately steep slopes on benches, major ledges and ridge lines. The loamy and stony soils on these slopes are generally shallow to moderately deep. Soils in the remaining 1 percent of the WSA are deep loams on gently sloping basins on structural benches. Table 2 shows soil characteristics and land types, and Table 3 describes erosion conditions.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock outcrop	9	675	0	0
Shallow to moderately deep loamy and stony soils on sloping ridges and structural benches	49	3,675	1	5
Shallow to moderately deep stony soils on steep hillsides	41	3,075	1	10
Deep loamy soils on gently sloping basins on structural benches	1	75	0.1	1
Totals	100	7,500		

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss If Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20	—	—	—	—	—	—
High	10	—	—	—	41	3,075	30,750
Medium	5	—	—	—	49	3,675	18,375
Low	1	90	6,750	6,750	1	75	75
Very Low	0.1	1	75	7.5	—	—	—
None	0	9	675	0	9	675	0
Totals		100	7,500	6,757.5 ¹	100	7,500	49,200 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: .90 under present conditions; 6.56 if disturbed.

Vegetation

Existing vegetation types are summarized in Table 4.

The pinyon-juniper-sagebrush type is the largest and most complex vegetation type in the WSA

TABLE 4
Existing Vegetation Types

Vegetation Type	Acres	Percent of WSA
Pinyon-Juniper-Sagebrush	3,480	46
Pinyon-Juniper-Douglas Fir	2,680	36
Sagebrush	480	6
Riparian	30	1
Barren	830	11
Total	7,500	100

Source: USDI, BLM, 1982c.

and is generally found on moderate slopes and benches on fairly deep loam soils. The general appearance is sagebrush understory with considerable variation in the density of tree cover. Tree cover may vary from fewer than five trees/acre up to 200/acre. Associated plant species typically include Utah serviceberry, snowberry, Salina wildrye, needlegrass, western wheatgrass, lupine, and penstemon.

The pinyon-juniper-Douglas fir type generally occurs on shallow loamy soils and steep canyon slopes. North-facing slopes have higher percentages of Douglas fir. Common understory plants include Utah serviceberry, Oregon grape, locoweed, Salina wildrye, western wheatgrass, and squirreltail. Rock outcrops are a common inclusion in this type.

The dominant species in the sagebrush type are Wyoming and black sagebrush. Wyoming big sagebrush is found on deep productive soils while black sagebrush indicates a considerably shallower, less productive soil. Sagebrush sites are found at higher elevations in open parks along the ridges around the perimeter of the WSA. Common understory plants are balsam root, lupine, aster, Salina wildrye, western and bluebunch wheatgrass, needlegrass, Thurbers fescue, and bluegrass. Other shrubs are sporadically scattered among the sage, including Utah serviceberry, snowberry, and woods rose.

The riparian type is found in the bottom of Jack Creek. The riparian vegetation type may be underestimated as sites of less than 5 acres were not mapped during inventory. Riparian vegetation is dominated by tamarisk and willow. Also included in this type is a large stony loam bottom of big sagebrush. Other shrubs found in the type are rabbitbrush, snakeweed, Utah juniper, and prickly pear. Associated species also include erigonum, Russian thistle, lupine, locoweed, sweet clover, pepperweed, cheatgrass, saltgrass, sand dropseed, needle-and-thread, and Indian ricegrass.

JACK CANYON WSA

The barren areas are confined to rocky ridges and are scattered through the WSA, often as an intrusion into other vegetation types. Pinyon and juniper trees occasionally occur in barren areas. However, due to poor site characteristics, these trees are often dwarf and frequently assume unusual forms. Vegetative cover is generally less than 10 percent. Other species found are curlleaf mountain mahogany, needle grass, Fendler's bluegrass, and penstemon.

The Jack Canyon WSA is in the Colorado Plateau Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are juniper-pinyon woodland and Pine-Douglas fir forest. PNV is the generalized vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

No threatened, endangered, or sensitive plant species are known to occur in the WSA. Habitat in the WSA has not been identified for such species.

Water Resources

Jack Creek, an intermittent stream, is the main water source in the area, although water is also found in Pine Springs Draw. Twelve live springs keep segments of stream channels in Jack Creek and Pine Springs Draw wet for up to 1 mile in length. The entire 4.5-mile length of Jack Creek though the WSA runs during wet years and/or seasons of years. There are no developed water sources in the WSA. Present water use is mainly by wildlife and livestock. Water quality is relatively good due to geology, drainage area, and lack of upstream disturbance or pollution sources and is suitable for present uses. Water is probably safe for human consumption without treatment. Nevertheless, precautions are desirable as water quality data are lacking. The extent or quality of the ground water resource in the WSA is unknown.

Mineral and Energy Resources

The BLM, together with the U.S. Department of Energy, had each WSA, including adjacent areas under appeal to the Interior Board of Land Appeals (IBLA), assessed for energy and mineral resources by SAI (1982). The Jack Canyon WSA is within an appealed area adjacent to the Desolation Canyon WSA. For this reason, ratings

assigned for Desolation Canyon WSA are applied to Jack Canyon WSA, except where available site-specific information indicates otherwise. SAI ratings for oil and gas, coal, uranium, and hydro-power in the Jack Canyon WSA were modified by BLM. The results of the SAI ratings, with rationale for modifications, are discussed below. Table 5 summarizes energy and mineral resources for the WSA. Refer to Appendix 5 for a detailed description of the SAI rating system.

TABLE 5
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c4	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c3	37.5 to 50 million barrels of oil
Oil Shale	f2	c4	90 million barrels of shale oil
Uranium/Vanadium	f1	c3	None
Coal	f1	c4	None
Geothermal	f1	c3	None
Hydropower	f1	c4	None
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c3	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

An overall importance rating (OIR) of 2 was assigned to the Jack Canyon WSA. The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by = or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these

reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

A portion of the Greater Jack Canyon KGS (70,822.25 total acres) covers 4,750 acres of the Jack Canyon WSA. Production of gas is occurring in the WSA and has occurred since 1976. A well (Peters Point 13) was drilled in 1976 and produced a 3-year average of 3.6 million cubic feet of gas before being plugged. Another well (Peters Point 14-9), was drilled in 1981 and produced a total of 412 million cubic feet of gas as of April 1985. The wells in the WSA produce from zones at the base of the Green River Formation, in the upper Wasatch Formation, and a unit in the lower Wasatch Formation. Production (1952 to May 1983) from the entire Peters Point Field, a 4,440-acre portion (1,240 acres in the WSA) of the Greater Jack Canyon KGS, is about 2.9 billion cubic feet of gas and 14,000 barrels of oil. One other well was drilled in the WSA and was plugged and abandoned. Production pipelines follow over 2 miles of the WSA boundary and production facilities are located at the Peters Point 14-9 well location in the WSA and at Peters Point 4 well adjacent to the WSA. A separator is located along the boundary pipeline in Jack Creek Canyon.

The rating given for oil and gas potential resulted from the probability of finding relatively low amounts of oil and gas within the WSA, primarily due to the small size of the WSA. The certainty of the resource occurring in the WSA is high. Potential exists in the WSA for up to 10 million barrels of oil and 60 billion cubic feet of gas in-place. The high degree of certainty (refer to Table 5) is based on (1) current production from the WSA; (2) structural and stratigraphic conditions that are fairly well identified; and (3) production history around the WSA. Up to 18 billion cubic feet of gas and up to 3 million barrels of oil would be considered

recoverable. (Refer to Appendix 6 for an explanation of recoverability estimates.) Based on the present recovery ratios in the area, the projected oil production is higher than would actually occur because the area is mostly favorable for natural gas.

Rocks exposed at the surface or underlying the WSA have produced moderate amounts of gas and smaller amounts of oil from wells in the WSA and vicinity. Eleven wells have been drilled within 1 mile of the WSA. Six of these are producing oil or gas, while the remainder are plugged and abandoned. In addition, the location of the WSA on the southwest flanks of the Uinta Basin and mostly north of major faulting bordering the Jack Creek Anticline (an upward flexing or doming of the rock) reinforces the favorability of known source rocks. About 5,000 acres of the WSA are northeast of this fault. Production is from the same strata in the WSA, lower Green River and upper Wasatch, as those responsible for the majority of production in the Uinta Basin.

Formations deeper than the Green River and Wasatch are largely unexplored in the vicinity. One producing well, 1 mile north of the WSA, was drilled to 17,408 feet in depth through most formations known to be favorable for oil and gas production in eastern Utah and western Colorado, including the Moenkopi, Navajo, Morrison, Entrada, Cedar Mountain, Dakota, Mancos, and Mesa Verde Formations. These formations are below the surface of the WSA at about 5,000 to 17,000 feet. This well (Peters Point 101) has produced 28,974 cubic feet of gas per year from the Dakota Formation (17-month average).

Oil and gas leasing categories were established in the WSA by the "Price District Oil and Gas Categories Environmental Analysis Report" (USDI, BLM, 1975). These categories were revised in 1983-84. As a result, most of the WSA (7,100 acres) is in leasing Category 2 (open with standard and special stipulations) requiring that activities be mitigated to avoid serious erosion of watershed problems. The remaining 400 acres are in Category 3 (open to leasing with no surface occupancy). As of 1984, approximately 70 percent (5,260 acres) of the WSA was under lease for oil and gas. Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These

stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a).

Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Pre-FLPMA oil and gas leases cover 1,340 acres and post-FLPMA leases cover 3,920 acres.

Several lessees in the area have unitized to form the Peters Point Unit. A portion of the Peters Point Unit is held by production established and ongoing since 1952. All of the pre-FLPMA leases in the WSA are held in the Peters Point Unit. The total size of the Unit is 10,090 acres, of which about 13 percent (1,340 acres) is within the WSA. The Peters Point Unit is also located in the Greater Jack Canyon KGS. Approximately 2,240 acres in the WSA are not leased.

COAL

The WSA is underlain by the Blackhawk Formation which probably contains coal seams of unknown thickness. The coal would be more than 6,000 feet under the surface and is not considered a recoverable resource. Mining limitations typically do not allow recovery of coal deeper than 3,000 feet. For these reasons, the favorability rating of f4 assigned for coal to the Desolation Canyon WSA is reduced to f1 for the Jack Canyon WSA. The WSA is not considered to have potential for coal production and none of the WSA is leased for coal. Data availability on coal-bearing formations in Carbon County is good and has been obtained through coal exploration and mining. Thus, the certainty is high (c4) that the WSA has no potential for coal production.

TAR SAND

A portion of a detached block and a portion of the main block of the 157,445-acre Sunnyside Special

Tar Sand Area (STSA) overlap about 2,000 acres of the WSA. The Sunnyside STSA is considered to have the largest, best exposed, oil-impregnated sand deposits in the southwestern Uinta Basin. However, no outcrop and none of the best reserves (higher quality tar sand near the outcrop) are within the WSA (Ritzma, 1979). Potential for tar sand production in the Jack Canyon WSA is considered low due to the small size of the WSA and the depth to the resource. A low favorability is assigned for the WSA, indicating a potential for up to 37.5 to 50 million barrels of oil in-place. If the tar sand deposit in the WSA were developed, recovery methods would be expected to be by in-situ methods, yielding about 20 to 30 percent of the in-place resource using present technology. It is estimated that up to about 10 million barrels of oil from tar sand could be recovered in the WSA because it is near the edge of the STSA. This would represent up to 0.3 percent of the total estimated reserves for the entire Sunnyside STSA. The certainty that a deposit in this range is present in the WSA is moderate due to the nearness of known oil-impregnated rocks and the assumed lateral continuity of oil saturation. The high certainty rating by SAI for the Desolation Canyon WSA was modified to low for the Jack Canyon WSA because there are no known data points to indicate a known occurrence for the Jack Canyon area.

Tar sand is present in the lower member of the Green River Formation and upper portions of the Wasatch Formation where petroleum is at or near the surface. Tar sand would be expected to be up to 1,000 feet or more below the surface of the WSA. No exploration of the deposit at or near the WSA has occurred. The WSA is about 9 to 10 miles east of the main outcrop for the Sunnyside STSA.

No oil and gas leases within the WSA are currently being considered for conversion to combined hydrocarbon leases (which would then include tar sand) under the Combined Hydrocarbon Leasing Act of 1981 (Ninety-Seventh Congress of the U.S., 1981). No tracts have been identified within the WSA for competitive leasing. The tar sand production in the vicinity has been from the outcrop 9 to 10 miles from the WSA. Intermittent mining of the outcrop for paving material occurred between 1892 and 1945. Surface mining of tar sand for its oil content has been proposed for areas 8 to 9 miles east of the WSA.

OIL SHALE

A low favorability rating for shale oil production was assigned to the WSA due to the thin, low

grade oil shale beds found in the vicinity of the WSA, particularly relative to richer oil shale deposits in other areas of the Uinta Basin (SAI, 1982). The high certainty rating is assigned because the WSA is known to contain oil shale.

An estimated 5,000 acres of the WSA are underlain by oil shale and contain an estimated in-place resource of 90 million barrels. Oil shale beds in the Uinta Basin are estimated to contain an in-place reserve of 320 billion barrels occurring in zones of up to 700 feet thick. The oil shale in this part of the region is found in the Mahogany Beds of the Parachute Creek Member in the Green River Formation. The overall depth varies from 2 to 60 feet. Richness in organic matter varies 3 to 90 gallons per ton of rock within the bearing zone. The generally recognized lower limits for a potentially commercial oil shale deposit are an average richness of 15 gallons per ton and a thickness of at least 15 feet. The deposits in the WSA are estimated at about 15 feet thick, could yield about 15 gallons per ton, and contain an estimated 27 million barrels of recoverable shale oil or about 0.008 percent of the in-place reserves of the Uinta Basin.

The entire WSA is under an oil shale withdrawal. This withdrawal, some 2,757,310 acres in total size, has been in-place since the 1920s. It prohibits development of the oil shale resource except under Federal leasing and prevents location of mining claims. Considering the large acreage of oil shale withdrawn and the fact that oil shale in large amounts is of higher quality and more accessible elsewhere in the Uinta Basin, it is believed that the oil shale resource in the WSA would not be extracted in the future.

GEOHERMAL AND HYDROPOWER POTENTIAL

No potential has been assigned to the WSA for geothermal resources. The overall geothermal potential of the Colorado Plateau is very low and the only potential associated with the WSA would be as deep, low-temperature thermal waters. If such waters are present, it is very unlikely they will ever be developed.

No potential has been assigned to hydropower as the WSA contains no perennial streams capable of even small-scale (0.05 to 15 megawatts) development. The certainty rating is high.

LOCATABLE MINERALS

Essentially no potential for locatable minerals, including uranium, vanadium, copper, manganese, and potash, is assigned for the WSA. The certainty of this rating is moderate for uranium

and potash. It is not certain that copper and manganese are present and direct data are not available.

The Green River Formation, at and near the surface of the WSA, is not considered favorable for locatable minerals. In the Wasatch Formation, about 2,000 to 3,000 feet below the surface, there is a chance for small deposits of uranium. The formations typically considered to be more favorable for locatable minerals are all well over 10,000 feet below the surface of the WSA. Due to their depths, none of these formations are expected to have mining potential. There are also no mining claims in the WSA nor any known or suspected occurrences of locatable minerals. Due to the oil shale withdrawal, the WSA is closed to mining claim location.

SALABLE MINERALS

Salable minerals in the WSA include sand, gravel, and rock. Mineral material sales in the vicinity have been limited to building stone. In 1979, 120 tons of rock were sold from an area west of the WSA. A common use area (4,234 total acres) for building stone has been established, including about 600 acres in the WSA.

Wildlife

A wide variety of wildlife inhabits the WSA. Springs, intermittent streams, riparian vegetation, and rugged terrain, including cliff and talus habitat, contribute to maintaining a diversity of wildlife. Only the more common or distinctive species are discussed here. Major species of interest include Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, sage grouse, golden eagle, and prairie falcon. No facilities for wildlife management exist in the WSA, and none are planned in the future.

The WSA is within the historical range for Rocky Mountain bighorn sheep. Twenty-two sheep were reintroduced into the vicinity on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek, about 20 miles south of the WSA in Desolation Canyon. They are reoccupying historical range including 4,110 acres in the canyons of Jack Creek and Pine Springs Draw which are considered yearlong, high priority habitat. The total range for the bighorn sheep herd is 127,690 acres. One bighorn sheep skull was found in Flat Canyon, about 3 miles south of the WSA, in 1979, indicating historic use or possibly present use near or in the WSA. On the basis of prorating population to total habitat, the present population for the WSA is estimated at one animal, while prior stable carrying capacity is 28.

Mule deer winter and critical winter ranges (about 120 acres) for Herd Unit 27B are found in the WSA. The critical winter range is the riparian vegetation type with a large sagebrush inclusion in the bottom of Jack Creek. The WSA contains less than 0.1 percent of the critical range for Herd Unit 27B (121,440 total acres). Winter forage is not presently considered limiting for the herd unit. The estimated present population is two deer, while the carrying capacity is four.

Elk disappeared from the Range Creek herd as they did in the adjacent Avintaquin and Manti herds in the early 1900s. The Avintaquin and Manti herds were reestablished by transplant beginning in 1924. Populations in the Range Creek herd are being reestablished by movement from adjacent herds. The present population estimated for the WSA is one elk, with a prior stable carrying capacity of 23. About 6,720 acres (2 percent) of the 320,025 acres of winter range identified for the Range Creek herd is located in the WSA. Vegetation treatments discussed in the Livestock and Wild Horses/Burros section could also benefit elk.

Mountain lion and black bear are both common to the entire WSA and populations are considered healthy, although accurate population counts are not available. The total habitat identified for these species is 601,290 acres, only 0.01 percent of which is in the WSA. The WSA may include critical habitat for black bear based on the observed consistency of use over the last 4 years.

The only upland game bird found in the WSA is sage grouse. It is found in sagebrush communities on flat or shallow slopes. Other nongame birds include a large number of perching species and shore birds, commonly including the canyon wren, blue-grey gnat catcher, western kingbird, pinyon jay, magpie, and junco.

Raptors nesting, wintering, or migrating in or through the WSA include golden eagles, prairie falcons, Cooper's hawks, goshawks, American kestrels, and red-tailed hawks. Although no raptor inventory has been done for the WSA, nesting habitat is present and/or use has been documented in the vicinity of the WSA.

Two Federally listed endangered raptor species are also believed to use the WSA. The peregrine falcon is believed to use the WSA during spring and fall migration and as a winter resident. Suitable nesting habitat for this species is not known to occur in the WSA. The bald eagle also occurs during migration and possibly during the winter. Bald eagle sightings have occurred in the vicinity. Although the WSA lies within the range of the

endangered black-footed ferret, habitat types in the WSA are not suited to this species. The Fish and Wildlife Service (FWS) has identified the following six candidate species that may occur in the WSA: ferruginous hawk, Western snowy plover, white-faced ibis, long-billed curlew, Southern spotted owl, and Western yellow-billed cuckoo.

Forest Resources

Adequate volumes for small-scale noncommercial fuelwood or timber harvest occur in the tree-dominated vegetation types identified above in the Vegetation section. However, slopes would be prohibitive in much of the WSA for production. Remoteness, slope, poor accessibility, volumes, and distance to the mill would also limit potential for timber production. More suitable stands are available elsewhere and there is no known commercial or noncommercial interest. Some interest in fuelwood cutting could arise in the future along the boundary roads of the WSA in the pinyon-juniper vegetation type. At present, 82 percent of the WSA is considered nonproductive and noncommercial timber or woodland. The remaining 940 acres are on ridges to the north and south of the WSA along boundary roads. Fuelwood products could be harvested in these areas as an aid to proposed chaining projects. Volumes would average about 7 to 8 cords per acre. As much as 7,500 cords of harvestable fuelwood may be present in this part of the WSA.

Livestock and Wild Horses/Burros

The WSA contains a portion of the Green River North grazing allotment. The allotment has one operator, and the WSA portion is typically grazed spring through fall by cattle. The WSA occupies 4.5 percent of the 166,621-acre allotment. Of the 8,584 total AUMs in the allotment, the WSA contains 216 or 2.5 percent.

The potential exists to manipulate 940 acres of pinyon-juniper vegetation by chaining and seeding. The chaining of this acreage could yield 85 additional AUMs of forage. This potential chaining is based solely upon the biological suitability to increase livestock forage. The economic and technical feasibility, cost effectiveness, and consistency with BLM range policy criteria has not yet been evaluated and would be subject to a range monitoring program. Based on presently available information, size, location, and projected results, it is possible that this chaining could be suitable for implementation, depending on cost and technical factors.

Presently there are no range development projects located within the WSA. Potentially arable lands do not occur within the WSA, based upon terrain, water sources, and location.

The Range Creek wild horse herd of approximately 25 animals uses 1,300 acres of the WSA in the Pine Springs Draw and portions of Cedar Ridge vicinity. This represents about 3.6 percent of the total range for the herd.

Visual Resources

About 85 percent of the WSA (6,400 acres) rates as Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water through most of the canyons, and rich and pleasing color combinations (Ray Mann Associates, Inc. 1977). Two areas along Cedar Ridge and the ridge north of Jack Canyon rates as Class B scenery due to less vertical relief, less variation in vegetation, and the absence of water. The sensitivity to modifications in the landscape was rated as moderate. The area along the ridge north of Jack Canyon is considered in a foreground/middleground area to most viewers, while Cedar Ridge is rated as seldom seen. The geology, topography and vegetation combine to create a very scenic landscape in most of the WSA. Vertical-walled to steep V-shaped canyons comprise most of the topography. Rock walls, buttresses, caves, and pinnacles break up slopes of timber and brush. Water is a frequent element in the landscape. VRM classes adopted for the WSA are summarized in Table 6.

TABLE 6
Visual Resource Quality and Management Class

Element	Acres	Percent of WSA
Scenic Quality		
Class A	6,400	85
Class B	1,100	15
Class C	0	0
Totals	7,500	100
Management Class		
Class I	0	0
Class II	6,400	85
Class III	400	6
Class IV	700	9
Totals	7,500	100

Source: USDI, BLM, 1982c.

Cultural Resources

Several seismic lines in the WSA have been inventoried for cultural resources, historical and archaeological. Two Fremont archaeological sites were identified. One site consists of two rock-walled structures and the other is a rock art panel. Additional Fremont archaeological sites are known to be present around the WSA, including structures, rock art, and lithic scatters. No cultural sites are known which qualify for the National Register of Historic Places. The WSA has a moderate potential for the discovery of additional sites.

Historical use of the WSA is principally related to grazing operations by J. H. Lunt in the 1880s. That same operation was later purchased by Preston Nutter, and more recently by others. Historical structures or features related to ranching use are not known to occur in the WSA.

Recreation

Road access to the WSA is located near or around its entire perimeter. All road access connects to a road along Sagebrush Flat. The northernmost road is in a northern tributary drainage and borders the WSA in the bottom of the Jack Canyon drainage. A second road extends along a ridge east of Sagebrush Bench, also forming part of the northern WSA boundary. A third road leaves the second at Sagebrush Flat, crossing the Jack Creek and Pine Springs Draw drainages and forming the western WSA boundary. A fourth road extends along Cedar Ridge south of the WSA to a point on the ridge above the road in the bottom of Jack Creek.

There are intermittent, primitive trails through Jack Canyon and Pine Springs Draw which were probably established by horses, cattle, and wildlife use. The trails are difficult to follow in places and require many creek crossings during spring runoff and wet years. ORV use is infrequent in the WSA, although the Price River MFP designates the area open to ORV use. One passable vehicle trail enters the WSA for about 0.25 mile to an abandoned drill site in the bottom of Jack Canyon. The remainder of the WSA, including 1.5 miles of abandoned way, is not known to be used by ORVs. The area generally is not well suited to vehicle use due to terrain limitations. Steep slopes, rock outcrops, and dense vegetation would make travel away from the major canyon bottoms difficult and challenging.

A number of the WSA's features make it attractive for recreation experiences. Specific features of

interest include unusual rock features, springs and pools, occasional wildlife sightings, challenging hiking opportunities, and good vehicle access to the WSA. Some possibility for paleontological and archaeological sights also exists.

Hiking and climbing are the activities for which the WSA is best suited. Routes between the canyon bottoms and ridges generally follow natural drainages. Routes and primitive trails through the WSA offer moderate to difficult hiking with creek fords, fallen trees and boulders, steep terrain, and dense vegetation being the principal challenges. Pinnacles and cliffs offer opportunities for technical rock climbing. Use for hiking and climbing is very limited at present.

Fishing opportunities are not available in the WSA. Hunting opportunities in the WSA and surrounding area are good. Terrain has limited most use to the plateau and bench areas along the north, west, and south boundaries. Based on known use patterns, an estimated 15 to 30 deer hunters use the WSA. Potential exists for hunting grouse, dove, rabbit, mountain lion, and black bear. In the future, elk may be hunted if a viable herd becomes reestablished.

Horseback riding and horse packing along the primitive trails in Jack Creek and Pine Springs Draw are possible, but would be difficult due to terrain. There is no evidence of regular or current recreational horseback riding use.

Although very little, if any, winter recreation use now occurs, snow cover in the WSA is favorable for winter sports for approximately 3 months of the year. Steep slopes would limit cross-country skiing in about 80 percent of the WSA. Opportunities for winter camping and snowshoeing are fair to good along the ridge tops and benches.

The recreational use of the WSA is currently estimated at 100 visitor days annually. All of the use is attributed to primitive and recreational activities (such as hunting, sightseeing) that currently utilize vehicular access on existing ways. No visitor days are related to commercial outfitting.

Wilderness Values

SIZE

The Jack Canyon WSA is 7,500 acres in size. It is about 6 miles long (northeast-southwest) and about 4 miles wide (northwest-southeast).

NATURALNESS

There is one substantially noticeable imprint within the WSA. It is a drill site, access road, and

pipeline leading into the WSA from Cedar Ridge. The road is about .75 mile long and portions are constructed along side slopes. The drill site is in a grassy opening on a bench between Cedar Ridge and Jack Creek. The site was drilled in 1980 on a pre-FLPMA lease and is currently producing gas (refer to Mineral and Energy Resources section). The drill site and road are visible for long distances when viewed from the north, and no further reclamation is expected in the near future.

There is a drill site in Jack Canyon located about 0.25 mile from the northeast WSA boundary. The site was drilled in 1976 and now is abandoned. Vehicle access to the site could no longer be considered substantially noticeable. However, the drill site itself still presents a noticeable contrast to the surrounding landscape. Some facilities are still in-place and the pad area remains evident. The area affected by this imprint is localized and the imprint is located very near the WSA boundary. Based on these factors, it does not impair the naturalness of a significant portion of the WSA when viewed in the area as a whole.

There are three old vehicle ways extending into the WSA from the bench road on the northern boundary. There is an abandoned drill site along one of these ways. These ways extend less than 1 mile into the WSA and total only 1.5 miles. They have generally revegetated, although sections cut through pinyon-juniper stands and the drill site are evident. While these imprints may be noticeable in localized areas, they are not substantially noticeable in the area as a whole.

The naturalness of about 2 percent of the WSA (150 acres) is adversely affected by the drill site access and pipeline. The remaining imprints affect about another 1 percent of the WSA (75 acres); however, these areas meet the naturalness criterion because they are not substantially noticeable in the WSA as a whole. In all, 7,350 acres could be considered to meet the naturalness criterion.

SOLITUDE

The combination of size, configuration, topography, and vegetation is such that in the majority of the WSA rather secluded spots are present. Vistas can be found along the edges of plateaus and benches around the boundary of the WSA.

The drainages of Pine Springs Draw and Jack Creek are narrow, twisting, and steep throughout most of their lengths and are separated by broken and irregular ridge lines. The upper portions of Pine Springs Draw and its forks above 7,000 feet are the most open areas. On the bench areas

along the north and south boundaries, the terrain is less severe, but the pinyon-juniper vegetation type provides excellent screening. There are several sagebrush areas along boundary roads to the north and south where neither vegetation nor topography provide significant screening.

Vegetation complements topography in providing opportunities for solitude in most of the WSA. In 80 percent of the WSA, tree cover is a dominant feature in the vegetation. Tree cover in the pinyon-juniper-Douglas fir type often has a closed canopy and is moderate to heavy. Tree cover in the pinyon-juniper-sage community is variable. In the majority of these types, trees and brush do make a significant contribution to opportunities for solitude.

Off-site influences of significance are related to past and present oil and gas activity. Oil and gas exploration imprints are quite visible from a number of locations along the northern boundary of the WSA. Vehicle use of the Cedar Ridge road and the road in Jack Canyon occurs on a regular basis to access producing gas wells. Off-site influences generally affect about 3 percent (225 acres) of the WSA, primarily along its boundaries.

In summary, about 97 percent of the WSA (7,275 acres), meets the solitude criterion for areas under wilderness review. In about 3 percent of the WSA (225 acres), along the north and south boundaries, opportunities for solitude are less than outstanding, primarily due to off-site influences.

PRIMITIVE AND UNCONFINED RECREATION

Those outstanding primitive recreation values for which the WSA is best suited include hiking, climbing, hunting, camping, and sightseeing activities related to the WSA's scenic, geologic, and wildlife features. Horseback activities could occur, but would be limited. Based on these opportunities, the entire WSA (or 7,500 acres) meets the primitive recreation criterion for areas under wilderness review.

SPECIAL FEATURES

The Jack Canyon WSA is highly scenic when viewed from the canyon bottoms. Variety in vegetation, erosional remnants and features, creeks and springs, and good wildlife habitat all combine in an interesting and scenic landscape. The archaeological potential of the area is largely unknown but significant sites are known to be present nearby (outside the WSA) in Nine Mile Canyon and Desolation Canyon. High-value wildlife habitat features include the intermittent stream and spring riparian associations in Jack

Creek and Pine Springs Draw and cliff and talus habitats.

Land Use Plans and Controls

Roads forming the boundaries of the WSA are under BLM administration. No rights-of-way are located within the WSA.

Although land within and adjacent to the WSA is primarily Federally owned, there is one State section in the WSA and one adjacent to the WSA. Also, a 40-acre parcel of land in the WSA is privately owned. Right of access to the private land would be maintained.

The likelihood that State lands would be developed for oil and gas over the long term is good due to favorable geologic conditions. Further, the management philosophy for all State sections is to maximize economic returns for the State School Fund. No activity is currently occurring on this State land.

The Carbon County Commission (1981) has zoned the area within the WSA as Critical Environmental 1 (CE-1). Land use objectives for the CE-1 zone are:

1. To protect and conserve the water supply, vegetation, soils, wildlife, and other natural resources within the watershed.
2. To avoid the creation of hazards from floods, fire, and other dangers.
3. To preserve aesthetic appearance of the landscape.
4. To prevent the degradation of the environment and waste of natural and financial resources.

Permitted uses under CE-1 include grazing and pond construction. Major construction requires approval by the county. The WSA represents about 0.8 percent of the acreage in Carbon County.

Public lands in the WSA are managed by BLM under the Price River MFP (USDI, BLM, 1983). Specific management actions in the MFP affecting the Jack Canyon WSA generally allow for multiple use as described in the No Action Alternative. Specifically, the RMP discusses continuation of present grazing management and practices (Green River North Allotment), establishment of a building stone area overlying 600 acres of the WSA, and placement of high priority on mineral production from the Greater Jack Canyon KGS.

Socioeconomics

DEMOGRAPHICS

The WSA is located in the northeastern portion of Carbon County. Carbon County had a 1981 population of 23,200, 2 percent of the State's total population. The county has one major service center, Price (population 9,086). Sunnyside and East Carbon City (total population 1,942), are the nearest communities to the WSA, about 15 miles to the southwest. Most access to the WSA is through Price and Wellington via Nine Mile Canyon or through Sunnyside and East Carbon City via Bruin Point. Carbon County comprises 1,474 square miles or about 940,800 acres. About 49 percent of the county is managed by the Federal government, 9 percent by the State, and 42 percent is privately owned.

EMPLOYMENT

Growth in the affected area is closely linked with the coal industry. Up until the recent slump in the coal market, the local coal industry was expanding rapidly. The region's population increased 62 percent between 1970 and 1980. However, between 1981 and 1983, employment in the local coal industry decreased 15 percent. Despite this recent slump, the coal industry remains the area's largest employer (Utah Department of Employment Security, 1981 and 1983). The construction and operation of electrical generating plants also provide a large share of employment in the area. The local income and employment attributable to these powerplants are reflected in the construction, public utilities, and mining sectors. A number of other businesses depend on the coal mine and powerplant activities for sale of their products, and many retail and service businesses depend on worker's local expenditures. Personal income and employment for Carbon County are shown in Table 7.

INCOME AND REVENUES

Past activities in the WSA that could be of local economic consequence include oil and gas exploration and production, livestock, and recreation. Table 8 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

The WSA has no mining claims and, therefore, no economic activity related to locatable minerals due to the oil shale withdrawal.

TABLE 7
1981 Personal Income and Employment
Carbon County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	less than 1	less than 1
Total Agricultural	less than 1	less than 1
Mining	45	27
Construction	6	5
Manufacturing	2	3
Transportation and Public Utilities	11	8
Wholesale Trade	5	5
Retail Trade	8	15
Finance, Insurance and Real Estate	2	3
Services	9	15
Other	—	—
Total Private Industry	88	79
Federal Government	2	4
State and Local Government	10	17
Total Government	12	20
Total Nonagricultural	100	99
Unemployment (1st Quarter, 1983)		16.9
	(Dollars)	(Jobs)
Total Employment and Earnings	\$172,517,000	9,914
Total Personal Income	\$229,540,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Employment figures include wage and salary employment. The relative importance of farm equipment is, therefore, underrated.

TABLE 8
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	None	None
Oil and Gas Leases	Unknown	More than \$15,780 ²
Livestock Grazing	\$4,320	Up to \$303
Recreational Use	Less than \$410	No commercial permits
Total	Less than \$4,730	About \$16,083

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

²Does not include royalties from current natural gas production.

Oil and gas exploration and production from the WSA has accounted for an unknown amount of local employment and income. The drilling of three wells, bringing two of these wells into production (only one is still producing), and operating and maintaining these wells has required approximately 15 man-years of labor in the past 10 years, some of which represents local employment.

One livestock operator has a total grazing privilege of 216 AUMs within the WSA. If all this forage were utilized, it would account for \$4,320 of livestock sales including \$1,080 of ranchers' returns to labor and investment.

The WSA's motorized and nonmotorized recreational use and related local expenditures are low. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). Study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Jack Canyon WSA is estimated as about 100 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Carbon County.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 8).

Oil and gas leases in the WSA cover approximately 5,260 acres. At \$3 per acre, lease rental fees generate up to \$15,780 of Federal revenues annually. In addition, the Federal government has received revenues from royalties and bonus bids related to production and leasing in that portion of the KGS located in the WSA. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittee in the WSA can use up to 216 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$303 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of range improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and other leasable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future mineral development is unknown; however, with the exception of oil and

gas, future development possibilities are considered low due to more favorable deposits elsewhere and the rugged terrain of the WSA. Oil and gas development potential is considered moderate. The following analysis is based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; and tar sand, 1,340 acres. A potential chaining-and-seeding project would disturb 940 acres. Because the potential chaining would occur in areas most likely disturbed by mineral development, total surface disturbance in the WSA would not exceed 1,500 acres. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.)

AIR QUALITY

The WSA would continue to be managed as a PSD Class II area. Disturbance of up to 1,500 acres could result in moderate increases in fugitive dust emissions. The likelihood of this magnitude of disturbance is low, since extraction of the tar sand resource would be only a long-term probability. Development of oil and gas resources and chaining-and-seeding activities, however, would most likely continue in the short term, causing an estimated 1,100 acres of surface disturbance. This amount would result in only a short-term increase in fugitive dust emission; therefore, air quality would likely remain essentially as at present. Any increases in fugitive dust emissions would decline as vegetation became reestablished. Development of the tar sand resource in the non-WSA parts of Sunnyside STSA could affect air quality in the WSA (USDI, BLM, 1984b).

GEOLOGY

Impacts to geology in the WSA would not occur but topographic changes could result from surface disturbance associated with oil, gas, and tar sand exploration and development activities. Surface disturbance could be as much as 1,500 acres. An undetermined amount of subsidence could result in a settling of the surface and possibly surface fracturing resulting from in-situ development of tar sand. Oil and gas resources would most likely continue to be developed as well as the potential chaining-and-seeding project, causing an estimated 1,100 acres of disturbance in the short term. This surface disturbance would cause only minor impacts to the topographic environment primarily in terms of visual character.

SOILS

Chaining activities would result in minor amounts of temporary erosion and could actually lead to long-term stability increases on the treated lands.

Up to 1,500 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.90 cubic yard/acre/year. Soil loss on disturbed areas in the WSA is estimated at 6.56 cubic yards/acre/year. This relatively high rate of potential soil loss could be attributed to steep terrain over much of the WSA. Soil loss on the 1,500 acres would increase from about 1,350 cubic yards/year up to about 9,840 cubic yards/year. Soil loss would decrease as reclamation occurred. Generally on steep slopes, such as those in the WSA, stockpiling topsoil is difficult. Desirable soil properties may be lost with the resultant mixing of soil and large quantities of cut material. Consequently, under these conditions reclaimed soils can be of poor quality and may require topsoil hauling or upgrading measures to insure successful revegetation and soil stability.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 8,490 cubic yards over current annual soil loss.

VEGETATION

The anticipated maximum of 1,500 disturbed acres would have a significant effect on the vegetation types within the WSA. Most of the impact to vegetation would result from the chaining-and-seeding project and potential tar sand extraction. Oil and gas activities with up to 160 acres of surface disturbance would not result in a major alteration of any vegetation type in the WSA. The potential 940-acre chaining-and-seeding project would change the vegetation from a primarily pinyon-juniper-sagebrush vegetation type to a grass-shrub type. Over time, these acres would tend to revert back to the original vegetation type unless the area was treated again. Some localized disturbance of the riparian vegetation type is anticipated, but major losses would not occur as streambank areas generally would be avoided by surface-disturbing actions according to normal lease stipulations and BLM management practices.

There are no known sensitive, threatened, or endangered plant species in the WSA. However, before authorizing surface-disturbing activities, BLM would conduct site-specific clearances to ensure that no uninventoried species are present.

WATER RESOURCES

Most erosion currently occurring within the WSA is natural, rather than caused by human activity. Where surface disturbance would occur, increased sediment yield could affect water qual-

JACK CANYON WSA

ity. Surface disturbance from mineral exploration and development and chaining activities could impact up to 1,500 acres with this alternative, with a soil loss increase of approximately 8,490 cubic yards per year. Short-term undetermined increases in total dissolved solids (TDS) would be anticipated in the two intermittent streams in the WSA. However, the nearby Green River into which these streams flow would not be noticeably affected. Over time, the potential 940-acre chaining-and-seeding project would enhance and allow for more effective watershed conditions. Given the nature of the water sources in the WSA, terrain features, and the type, location, and amount of surface disturbance anticipated, water quality would be expected to remain within acceptable limits for present uses.

The extent and quality of the ground water resource in the WSA is not known. However, the location of 12 springs in the WSA indicates ground water presence. In-situ mining of tar sand could disrupt ground water movement and lower ground water quality. Some of the 12 springs could dry up or experience reduced flow. Development of the oil and gas resource and the chaining-and-seeding project likely would not affect ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas production would be unaffected with this alternative. The potential for future exploration and production of oil and gas would remain, and all 7,500 acres of the WSA would be available for mineral leasing (existing and new leases). Because the WSA overlies a known favorable gas structure, existing production would continue and additional future production is likely to occur. Up to 60 billion cubic feet of gas and 10 million barrels of oil in-place are estimated to occur in the WSA. Up to 18 billion cubic feet of natural gas and up to 3 million barrels of oil in the WSA are considered recoverable.

Tar Sand and Oil Shale

Approximately 37.5 to 50 million barrels of in-place oil from the tar sand resource exists, with up to 10 million barrels estimated recoverable. No lease conversions, applications, or tracts for competitive leasing have been identified within the WSA. Future leases could be considered, although the potential is low in the foreseeable future.

Approximately 90 million barrels of oil from the oil shale resource are estimated to be in-place within

the WSA, and about 27 million barrels are considered recoverable. The entire WSA acreage has been under a withdrawal for oil shale since the 1920s. Presently no shale has been leased within the WSA, and the potential for development of this resource is unlikely due to more productive oil shale deposits outside the WSA. Future leasing could be considered with this alternative should future conditions warrant; however, this analysis concludes that this is improbable.

Locatable Minerals

Because the entire 7,500-acre WSA is under a withdrawal for oil shale, mineral location is not allowed. Thus, the entire area would remain closed to mining claim location unless the withdrawal is revoked. Locatable minerals are not known to exist within the WSA, therefore, even in the future absences of the withdrawal, development of locatable minerals would be unlikely.

Salable Minerals

Sand, gravel, and building stone permits could be issued. Salable minerals would be available. The WSA has a low potential for most salable minerals due to low value, common occurrence elsewhere of most mineral materials present, and the unfavorable location of the WSA. The 600 acres identified as suitable for building stone extraction within the WSA would be available for this purpose.

WILDLIFE

Species sensitive to human encroachment or surface disturbance (i.e., black bear, mountain lion, bighorn sheep, and nesting raptors) would be forced from historical habitat by surface-disturbing activities throughout the estimated 1,500 acres potentially disturbed by development of minerals. Such species would be displaced to undisturbed habitat to the south and east of the WSA. For species that are just becoming reestablished, such as bighorn sheep and elk, habitat would likely be rendered unsuitable within the WSA. Actual numbers of animals that would be displaced (one bighorn sheep, one elk, and two mule deer) would be low; however, loss of potential habitat would be greater. The WSA has a potential carrying capacity of 28 bighorn sheep, 23 elk, and 4 mule deer. Mule deer habitat is concentrated in the riparian areas and not likely to be substantially disturbed. The chaining-and-seeding project (940 acres), while designed to increase livestock AUMs, also could provide additional forage for wildlife.

Full mineral development also could result in habitat loss for the Federally endangered peregrine

falcon and bald eagle. Both species use the WSA during spring and fall migration and are believed to be winter residents. The WSA provides a very small amount of the habitat for these raptors. Potential habitat in the WSA for six candidate species, if present, could be adversely impacted in disturbed areas.

FOREST RESOURCES

As much as 7,500 cords of fuelwood would be available for harvesting through green fuelwood sales or in conjunction with a vegetation treatment project. However, no fuelwood harvest has occurred in the past, and none is presently occurring. Long travel distances on dirt roads and difficult terrain could discourage and limit the cost effectiveness of harvesting the fuelwood. Therefore, implementation of the No Action Alternative would not result in a significant increase in woodland harvest or loss of forest resources in the Jack Canyon WSA.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the Price River MFP (USDI, BLM, 1983b). The 216 AUMs currently allocated within one allotment are assigned to one livestock permittee.

Few, if any, changes in current livestock management would result from this alternative. There are no existing range developments in the WSA. New developments would be implemented without wilderness considerations. The potential exists for 1,500 acres of disturbance by mineral exploration and development; this could reduce the number of available AUMs by an undetermined amount. The potential 940-acre chaining-and-seeding project could result in an increase of up to 85 AUMs and probably would offset, at least in part, any loss of AUMs resulting from mineral development.

About 1,300 acres of the WSA could continue to be used by the Range Creek wild horse herd (25 animals). Protection would continue under the *Wild Horse and Burro Act* (USDI, BLM, 1971).

VISUAL RESOURCES

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the maximum of 1,500 acres of surface disturbance would be adversely affected. VRM Class II management objectives would probably not be met during the short term, but probably could be met in Class III and IV areas. The majority of the WSA (6,400 acres) has been classified as VRM Class II. If roads, vehicular ways, and drill pads are located

throughout the area for energy and mineral exploration and development, visual quality in the entire WSA would be significantly reduced. There is low probability of extensive energy and mineral exploration and development in the foreseeable future, with the exception of oil and gas. Tar sand development is a possibility in the long term. Both activities would affect visual values while underway but visual impacts could be moderated through reclamation. Even after rehabilitation, some permanent localized degradation would be expected.

VRM Class II management objectives would probably not be met on the 440 acres of vegetation manipulation. About 500 acres of the chaining would be in Class II and IV areas. This intrusion would be visible and exceed Class II management objectives on 440 acres until the treated area returned to natural vegetation. The chaining project could be designed to meet Class II and IV objectives, but the intrusion could be permanent if the manipulated area were regularly maintained. This intrusion would affect visual resources on more than 12.5 percent of the WSA.

CULTURAL RESOURCES

Disturbance of up to 1,500 acres by mineral exploration and development and chaining activities with this alternative could inadvertently disturb or destroy unknown sites. However, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would lessen the chance of this happening.

Overall, there would be little effect on cultural resources due to the predicted moderate cultural resource values in the area and mitigating measures that would be taken prior to surface-disturbing activities. Vandalism (not currently a problem) could be expected to increase in proportion to the general population increase. There are no known potential National Register sites within the WSA; therefore, none would be impacted.

RECREATION

The entire 7,500 acres would remain open to ORV recreation use. Although existing use is infrequent and limited by terrain, some travel occurs on roads that border the WSA. About 1.5 miles of existing abandoned ways extending into the WSA in three locations along the northern boundary would be available to ORV use. A 0.75-mile road leading to a drill site north of Cedar Ridge road also would remain open for vehicular use.

Primitive recreational opportunities would be diminished on up to 1,500 acres of disturbed

JACK CANYON WSA

areas. If roads, vehicular ways, and drill pads are located throughout the WSA, primitive recreational opportunities and sightseeing values could be lost in the area altogether. However, roads and ways created for mineral exploration and development would improve access into the area for nonprimitive recreation. The chaining-and-seeding project would also have short- and long-term impacts on primitive recreation and sightseeing because of the effects of intrusions on natural scenic values.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreational use is expected to increase from the estimated 100 current visitor days per year to about 149 visitor days at the end of 20 years.

WILDERNESS VALUES

None of the 7,500-acre WSA would be designated wilderness, and management would continue under the Price River MFP. Identified wilderness values covering the WSA would not receive the degree of protection afforded by wilderness designation. Mineral- and energy-related surface disturbance would result in a significant loss of naturalness, solitude, and unconfined recreation throughout the WSA if roads, vehicular ways, and drill pads are located throughout the area. The most likely location for sites is expected to be on benches between the ridges and canyon bottoms. Although only up to 1,500 acres are projected for direct disturbance due to development activity, it is expected that the secondary impacts related to sights and sounds could affect the entire 7,500-acre WSA to the extent that it would not meet the naturalness criterion.

The WSA would not be managed to preserve opportunities for solitude; however, rugged terrain could preserve solitude opportunities in small areas. Topographic and vegetation screening would be altered in areas of surface disturbance. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing activities and associated vehicle use. This would reduce the visitors' opportunity to find a secluded spot in the 7,500-acre WSA. The WSA now includes 7,275 acres that meet the solitude criterion and 225 acres that do not.

LAND USE PLANS AND CONTROLS

Land use plans dealing with the area encompassed in the WSA are the Carbon County Zoning and the BLM Price River MFP. Implementation of this alternative would not change the present or expected short-term use of lands in the WSA. Grazing and other multiple-use actions would be consistent with the county plan; however, long-term future mineral development (e.g., tar sand) could create impacts not fully meeting all the environmental protection objectives of the county's CE-1 zoning. This alternative would be consistent with the management philosophy of the State of Utah which emphasizes economic return from State school sections.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If continued oil and gas activities in the WSA were developed it would not lead to a significant increase in employment and income for Carbon County, since these activities are currently ongoing. The probability of economic development of minerals other than oil and gas in the foreseeable future within the WSA is low. Future tar sand extraction could occur in the long term (with unknown employment and income effects) but oil shale development and locatable mineral mining are unlikely. (Refer to the Mineral and Energy Resources section for a description of mineral and development potentials.)

There would be no livestock-related economic losses because the existing grazing use (216 AUMs) and ability to maintain, replace, and build new range developments would remain as at present. The proposed chaining-and-seeding project would produce 85 AUMs of new allocated forage and could lead to \$1,700 of livestock sales, including \$425 of ranchers' returns to labor and investment. Such increases may not be fully realized due to loss of AUMs in areas disturbed by energy development.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase from the current 100 visitor days of annual use to 149 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), annual recreation-

related expenditures of up to \$611 attributable to the WSA would not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. Existing lease fees (refer to Table 8) and natural gas royalties would continue. There are 2,240 acres in the WSA open to oil and gas leases that are currently not leased. If leased they would bring up to \$6,720 additional Federal lease fee revenues per year in addition to possible new royalties from lease production and bonus bids from new leases in the Greater Jack Canyon KGSs. Half of these monies would be allocated to the State, a portion of which could reach the local economy.

Collection of livestock grazing fees (\$303 per year) would continue. The additional 85 AUMs (to the extent they are not offset by lost AUMs in disturbed areas) produced by the potential vegetation treatment project and allocated to livestock under this alternative would increase Federal revenues by up to \$119 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (7,500 Acres)

As noted in the Description of the Alternatives section, major changes that could occur in the 7,500-acre Jack Canyon WSA would be related to its closure to new mineral leasing and sale. The WSA would continue to be closed to mineral location. The entire area would be placed in oil and gas leasing Category 4 (closed to leasing). About 1.5 miles of existing vehicular ways in the WSA would be closed to vehicular use, except on approval by BLM as noted in the Description of the Alternatives section. A 0.75-mile road to a producing gas well would be open to use by the lessee. The WSA would be closed to ORV use. It is assumed that the potential 940-acre chaining-and-seeding project would not be allowed. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that post-FLPMA oil and gas leases not covered by unit agreement would expire before production of commercial quantities. These oil and gas leases would not be renewed and future leasing of oil and gas, as well as other mineral resource leasing, would not be allowed. Also, it is assumed that pre-FLPMA leases held by production would continue to be explored and developed, causing an estimated 30 acres of disturbance. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller with wilderness designation than with the No Action Alternative (30 vs. 1,500 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, water, forest, and cultural resources would be insignificant for the All Wilderness Alternative. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

It is estimated that up to 30 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about 0.90 cubic yard/acre/year. The average soil loss on disturbed areas in the WSA is estimated at 6.56 cubic yards/acre/year. Soil loss on the 30 acres would increase from 27 cubic yards/year to 197 cubic yards/year. Soil loss would decrease as reclamation occurred.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 170 cubic yards over current annual soil loss. Any erosion control benefits arising from the potential 940-acre chaining-and-seeding project would be foregone under this alternative. Implementation of this alternative would provide little opportunity for any future control of natural erosion within the WSA because of restrictions on surface modification.

WATER RESOURCES

Water quality in the WSA would remain essentially the same. The potential for increased soil erosion and sediment yield from 30 acres of mineral-related disturbance would not be significant in the WSA as a whole, but could affect watershed conditions in local areas during the period of disturbance. With this alternative, benefits to the watershed from the potential 940-acre chaining-and-seeding project and any other vegetation manipulation projects if proposed in the future, would be foregone. Major opportunities for development of water resources in the WSA would not be foregone because such opportunities currently are not present.

Continued oil and gas exploration and development in the area generally would be confined to the surface and widely spaced wells and would not be expected to significantly alter ground water flow or reduce ground water quality. Eventual in-situ extraction of oil from the tar sand resource could impact ground water.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 5,260 acres (1,340 acres pre-FLPMA and 3,920 acres post-FLPMA) are leased for oil and gas in the Jack Canyon WSA. Current average annual production of more than 100 million cubic feet of gas from the WSA would not be affected. Future production from pre-FLPMA leases within that portion of the Peters Point Unit located in the WSA (1,340 acres held by well established production) also likely would not be affected. Existing post-FLPMA leases would be expected to expire without production and would not be reissued. About 2,240 acres of the WSA would remain unleased for oil and gas.

Exploration for and development of that portion of the potential in-place resource of up to 60 billion cubic feet of natural gas and 10 million barrels of oil not located in the pre-FLPMA lease areas could be foregone. The most likely range for production potentially foregone, based on current information, is up to 15 billion cubic feet of gas and up to 2.5 million barrels of oil. These estimates of resource foregone are based on the assumption that the oil and gas would be evenly distributed throughout the WSA and that only the portion on the 1,340 acres in the Peters Point Unit would be recovered. Because of the KGS, it is most likely that more recovery would occur than identified on a pro-rated basis and, therefore, the amounts foregone would actually be less than stated; however, data are not available for quantification.

Tar Sand and Oil Shale

The WSA has not been leased for tar sand or oil shale and, with this alternative, leasing would not occur. Potential production of up to 10 million barrels of oil from tar sand would be foregone. An estimated 27 million barrels of oil from oil shale would also be foregone. Potential production of shale oil resources would not be anticipated because deposits in the WSA are of much lower quality than extensive deposits of oil shale located elsewhere in the State. Considering the quality and quantity of both tar sand and oil shale in the WSA, in comparison with the deposits elsewhere, and technological and economic considerations, the All Wilderness Alternative would not result in significant foregone opportunities of these two resources on a regional basis.

Locatable Minerals

The entire 7,500-acre WSA would remain withdrawn, thus preventing mining claim location.

Further, locatable minerals are not considered to exist within the WSA; thus, there would be no known potential locatable mineral development foregone with this alternative.

Salable Minerals

Sand, gravel, or building stone permits could not be issued. The WSA has a low potential for these resources due to common occurrence of most mineral materials present and the location of the WSA. The 600 acres identified as suitable for building stone extraction within the WSA would not be used for this purpose. This, however, is of low significance, given other building stone occurrences outside the WSA.

WILDLIFE

Wildlife species, particularly those sensitive to human presence and surface disturbance (i.e., black bear, mountain lion, nesting raptors, and bighorn sheep), would benefit due to the preservation of solitude, since surface disturbance would be limited to 30 acres. Black bear and mountain lion populations are considered healthy and stable. These populations would not expand, although near optimum habitat conditions would be maintained. Human use of the WSA could result in occasional encroachment, but this would have little, if any, overall impact. Habitat for nesting raptors would be protected.

Bighorn sheep populations in the WSA would be expected to expand from a current estimate of one animal to up to a maximum of 28 animals due to the habitat protection provided to 4,110 acres of historical range. The WSA constitutes about 3 percent of the total bighorn sheep range.

Habitat for game species, including deer (120 acres of critical winter range) and elk (6,720 acres of winter range) which are becoming reestablished, would be protected. The small area in the WSA identified as critical deer winter range (less than 0.1 percent of the total critical winter range for the herd) diminishes its significance. The potential population increase is only four deer. Elk populations could increase from the current population of one animal to a total of 23 animals.

No impacts to threatened, endangered, or sensitive animals (including the six candidate species, if present) would be anticipated from implementation of this alternative.

LIVESTOCK AND WILD HORSES

Present domestic livestock grazing would continue as authorized in the Price River MFP. The 216 AUMs currently allocated in the WSA are utilized by the livestock of one permittee and would

remain available for cattle forage. Development of future roads or other livestock management facilities in the WSA could be restricted to preserve wilderness values. However, since little use of motorized vehicles is currently taking place to manage livestock in the WSA, little effect on the management of livestock is anticipated.

A potential 940-acre chaining-and-seeding project would not be allowed, and a subsequent potential gain of 85 AUMs would not occur. The anticipated 30 acres of surface disturbance from oil and gas activities would not noticeably affect forage availability for livestock.

About 1,300 acres of the WSA could continue to be used by the Range Creek wild horse herd (25 animals). Protection would continue under the *Wild Horse and Burro Act*.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. With this alternative, the potential for surface-disturbing activities that could impair visual quality would be limited to those with prior existing rights, and management would be under VRM Class I, which generally allows for only natural ecological change.

With this alternative, the disturbance from 940 acres of proposed chaining and seeding would not occur. The possible mineral-related disturbance would be 30 acres, associated with existing and continued pre-FLPMA oil and gas lease development. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. If additional roads and drill pads for the development of oil and gas leases in the Peters Point Unit were established, VRM Class I objectives might not be met on a larger portion of the WSA. Because the potential for development is relatively high on 1,340 acres, visual quality would probably be reduced in up to about 20 to 30 percent of the WSA.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an increase in primitive recrea-

tional use above the baseline rate. Judging from use densities of a number of well known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distribution about the WSA; and the availability of similar sites; it is estimated that, following designation, use could be as much as 750 visitor days per year (USDI, BLM, 1985). This is 650 visitor days over the area's estimated 100 annual visitor days. Management provided through a Wilderness Management Plan would control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. Because current use is infrequent, ORV use would probably not experience an overall decline in the vicinity of the WSA. Terrain conditions in nearly all of the WSA is very limiting for ORV use. About 1.5 miles of existing ways would be closed to vehicular use. The road (.75 mile) to a producing gas well would remain open to use by the lessee, but other users could be restricted. Commercial outfitters are not using the WSA at the present time and, with wilderness, designation little potential would exist solely for outfitter use of the Jack Canyon WSA. As recreation use increased, commercial operations based on use of the adjacent Desolation Canyon area could generate primitive recreational activities in the Jack Canyon WSA.

Mineral-related surface disturbance on up to 30 acres could cause localized impairment of primitive recreational values on up to 20 to 30 percent of the WSA, especially if it occurred in the form of roads and drill pads scattered throughout the 1,340 acres of pre-FLPMA leases held by production.

WILDERNESS VALUES

The entire WSA (7,500 acres) would be designated as wilderness, thus preserving wilderness values. Naturalness and opportunities for solitude and primitive, unconfined recreation would be maintained throughout the WSA, except on areas around the 30 acres that could be disturbed due to oil and gas development of pre-FLPMA leases in the Greater Jack Canyon KGS. As noted above, if this disturbance is widely distributed over the leased acreage, up to about 20 or 30 percent of the WSA could experience either direct or secondary impacts. This disturbance could have long-term effects on wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the majority of the WSA.

Visitation to the WSA for primitive recreation could be expected to increase from about 100

visitor days, to about 750 visitor days annually. The major portion of this use would be for hiking, hunting, sightseeing, and camping. It is not anticipated that this recreation use increase would significantly affect wilderness values.

LAND USE PLANS AND CONTROLS

Carbon County has zoned the area as Critical Environmental 1 (CE-1). This alternative would be generally consistent with the CE-1 zoning since management would emphasize wilderness (i.e., environmental values); however, several other resource uses would continue, although usually under more restrictive conditions.

Because the State land within the WSA would be exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns.

The BLM Price River MFP does not provide for wilderness designation. A decision by Congress to designate the WSA as wilderness would be an amendment to the MFP.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues (primarily due to oil and gas lease expiration) currently provided by resource uses in the WSA (refer to Table 8) as well as loss of potential future increases in income and Federal revenues that could occur otherwise with the No Action Alternative.

Oil and gas development in the WSA would continue on 1,340 acres but would not expand to the entire WSA. Valid existing oil and gas leases could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. The potential for other mineral development (tar sand and oil shale) would be foregone (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). It is estimated that, in the foreseeable future, potential mineral-related local income would not

be significantly reduced by wilderness designation. An unknown amount of local income and Federal revenue possibly could be foregone in the long term since the tar sand resource could not be leased and developed. Very little, if any, economic potential would be foregone with oil shale since any use of this resource in the WSA is unlikely.

Livestock use and ranchers' income would continue as at present with \$4,320 of livestock sales, including \$1,080 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. The proposed chaining-and-seeding project would not be carried out, and up to a \$1,700-increase in future livestock sales would be foregone.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (up to 750 annual visitor days). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would total about \$3,095 per year. This would be well distributed to the local and regional economy.

Motorized recreational use of the WSA is light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 3,920 acres of post-FLPMA leases would cause an eventual loss of up to \$11,760 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$6,720 annually in future Federal revenues from the 2,240 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in the KGS area could also be foregone.

Since the proposed vegetation treatment (chaining) project would not be developed and used, an estimated annual \$119 of Federal grazing revenues from 85 increased AUMs could be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation. No woodland harvest is currently occurring in the WSA. Therefore, no economic impacts related to these items would occur.

Recreation-related Federal revenues would not be expected to occur, except as a part of use in the adjacent Desolation Canyon area.

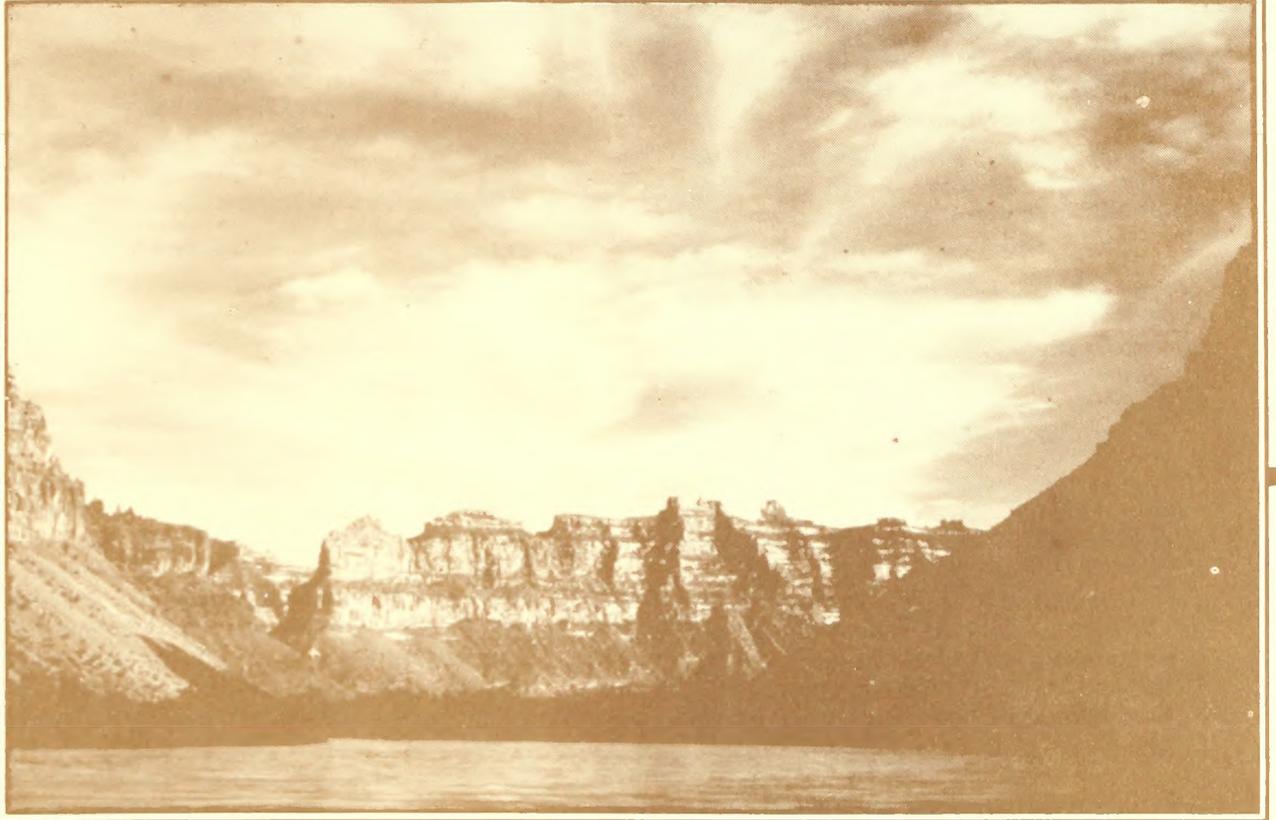
BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Carbon County Commission. 1981. *The Development Code of Carbon County, Ordinance No. 155*. December 28, 1981. Price, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hahn, Martha B. 1983. "Recreation Use in Justensen Flats Area" (unpublished document). April 1983. U.S. Department of the Interior, Bureau of Land Management, San Rafael Resource Area, Price, Utah.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semi-arid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ninety-Seventh Congress of the United States. 1981. "Combined Hydrocarbon Leasing Act." *Federal Register Notice*. January 5, 1981. U.S. Congress, Washington, D.C. p. 40160.
- Ritzma, H. R. 1979. *Oil-Impregnated Rock Deposits of Utah*. Utah Geological and Mineral Survey. Salt Lake City, Utah.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of WSAs Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*, Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management, 1971. *Wild Horse and Burro*

JACK CANYON WSA

- Act. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1983a. "Jack Canyon Wilderness Study Area Technical Report." (unpublished document.) July 1983. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1983b. "Price River Resource Area Management Framework Plan." (unpublished document.) December 1983. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982c. "Price River Resource Area Unit Resource Analysis." (unpublished document.) December 1982. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Scoping the Utah Statewide Wilderness Environmental Impact Statement —Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Sunnyside Combined Hydrocarbon Lease Conversion Final Environmental Impact Statement*. August 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah State Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Desolation Canyon WSA



DESOLATION CANYON WSA

could occur on up to 8,000 acres in the Little Park drainage. None of the coal in the WSA is currently under lease. The development of tar sand and oil shale also could occur but is not likely due to the location of more favorable resources elsewhere.

- The present domestic livestock grazing use in the area would continue as authorized in the Grand RMP and Price River MFP (8,963 Animal Unit Months [AUMs]). Use and maintenance of the existing six segments of fence, two reservoirs, and five improved springs would continue. New range developments could be implemented without wilderness considerations. One spring development, one small pond, and reconstruction of a diversion dam are proposed. Two potential vegetation treatments on 1,620 acres in the Green River and Little Park Allotments have been identified in this WSA. Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue.
- Developments for wildlife, water resources, etc. could be allowed without wilderness consideration if in conformance with the Price River MFP or Grand RMP. Water diversion proposals on Rock Creek for irrigation, on Green River for tar sand development, and a possible future dam and reservoir on the Green River in the WSA downstream of its confluence with the Price River could be allowed. Alternatively, the Green River could be designated as a Wild and Scenic River. The existing fenced stream enclosure at the mouth of Rock Creek would be maintained.
- The 289,650-acre WSA would remain closed to recreational off-road vehicle (ORV) use with use allowed only on the existing 29.5 miles of roads and and 5.5 miles of ways. Steep terrain limits ORV use in most of the WSA.
- Historical values within Desolation Canyon National Historical Landmark and cultural values within Flat Canyon Archaeological District would continue to receive management consideration under the National Historical Preservation Act and State Historical Preservation Office procedures.
- The entire 289,650-acre area would be open to forest product harvest. Primarily due to steep terrain and lack of access, there is no harvest of forest products at the present time, nor is any planned.

- The area would continue to be managed under Visual Resource Management (VRM) Class I (22,000 acres), Class II (252,490 acres), Class III (6,000 acres), and Class IV (9,160 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources without concern for wilderness values.
- Activities to gather information would be allowed by permit, provided these were accomplished in an environmentally sound manner.
- Hunting, including the use of motorized access on existing roads and ways, would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.
- A possible future variation under the No Action Alternative would be to designate a proposed Outstanding Natural Area (ONA) or National Natural Landmark for a 37,760-acre area identified by the National Park Service (NPS) as potentially suitable (May 6, 1983). This action would be independent of the wilderness study process and is not considered further in this document.

ALL WILDERNESS ALTERNATIVE

Under the All Wilderness Alternative (refer to Map 2), all 289,650 acres of the Desolation Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character.

Upon designation, Federal acquisition of all or part of 41 sections of State land (24,845.7 acres) within the WSA and eight sections (4,840.2 acres) adjacent to the WSA as requested by the State is likely, and would be authorized by purchase or exchange. Approximately 1,072.83 acres of split estate (Federal surface and non-Federal minerals) are also located in the WSA. Sixteen State sections adjacent to the WSA would probably not be exchanged. About 40 acres of private land located in the WSA would not be purchased or exchanged, and access to this land would be maintained. It is

DESOLATION CANYON WSA

Based on the conflict with oil and gas potential, the 430-acre parcel was not included under this Partial Wilderness Alternative.

It was suggested that a partial alternative include Little Pearl Wash and Jack Creek.

No known location or drainage within the WSA is named Little Pearl Wash. The name does not appear on any Geological Survey quadrangle maps covering the WSA.

Under the All Wilderness Alternative, all of the Jack Creek drainage to the boundaries of the WSA is included. Part of that drainage is also included in both Partial Wilderness Alternatives. Under the Partial Wilderness Alternatives, portions of the Jack Creek drainage (outside the Green River corridor) that overlap the Peters Point Oil and Gas Field and adjacent areas along the Jack Creek anticline are specifically not included because of the conflict with existing oil and gas resources. Exploration has occurred in this area as recently as 1981, and production occurred. Almost all of the leases there are held by established production dating to the early 1950s.

A suggestion was received for adding a partial alternative to exclude areas of high mineral potential, especially the road, drill pad, and surrounding lands on the Beckwith Plateau.

There is presently no confirmation that mineral values are relatively high on the Beckwith Plateau, when compared to surrounding areas. Many drill holes on or just around the Beckwith Plateau are dry and many were drilled into deep Paleozoic rocks. Presently available exploration data suggest higher potentials for both oil and gas and coal to the north of the Price River.

The smaller of the two Partial Wilderness Alternatives previously formulated by BLM does exclude the southern half of the Beckwith Plateau, the road, and the drill pad. The road and drill pad are also excluded by a "cherry-stem" into the designated area in the All Wilderness Alternative.

Alternatives Analyzed

Four alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (289,650 acres); (3) Partial Wilderness (242,000 acres) (Proposed Action); and (4) Partial Wilderness (143,350 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE

Under this alternative, none of the 289,650-acre Desolation Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area west of the Green River would continue to be managed in accordance with the Price River Planning Unit Management Framework Plan (MFP) (USDI, BLM, 1982c) and the area east of the Green River would be managed in accordance with the Grand Resource Area Resource Management Plan (RMP) (USDI, BLM, 1983). The Green River corridor would continue to be managed under the Desolation and Gray Canyons of the Green River Management Plan (USDI, BLM, 1979a). Three parcels (1,094.12 acres) of State land within the WSA have been identified in the existing plans for Federal acquisition through exchange or purchase. The remaining 23,751.58 acres of State land in the WSA have not been proposed for Federal acquisition. Private (40 acres) and split estate lands (1,072.83 acres of Federal surface and non-Federal minerals) also are expected to remain in non-Federal ownership (refer to Map 1). Refer to Volume I for further information on State in-holdings.

The following are specific actions that would occur under this alternative:

- About 161,850 acres of the 289,650-acre area would remain open to mineral location and sale while 127,800 acres would remain withdrawn to mineral location due to the presence of an oil shale withdrawal. Development work, extraction, and patenting would be allowed on 34 existing claims (260 acres) and any future mining claims, if determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines, without consideration for wilderness values. Existing oil and gas leases could be developed under standard and special stipulations (Category 2) on 206,200 acres. New oil and gas leases could be issued under Category 1 (standard stipulations) on 600 acres, Category 2 (standard and special stipulations) on 33,940 acres, and Category 3 (no surface occupancy) on 120 acres, without concern for wilderness values. About 48,790 acres would remain in Category 4 (closed to leasing). About 17,790 acres of existing leases could expire and would not be reissued in order to meet Category 4 restrictions. The special stipulations would restrict use to protect watershed and wildlife. Coal exploration and development

DESOLATION CANYON WSA

inclusion or exclusion of the Jack Creek drainage is addressed through comparison of the All Wilderness and large Partial Wilderness (242,000 acres) Alternatives.

Refer to the first comment and response for a more complete discussion on the Rattlesnake Canyon portion.

15. *Comment:* Utah has a significant amount of unallocated water in its apportionment of the Colorado River supply, and one of the few areas physically available is the lower Green River. Proposed uses are to supply municipal and industrial water needs to the lower Price-Green River corridor. Wilderness designation would needlessly restrict future critical water developments.

Response: At the present time, any possible proposals requiring or requesting municipal water projects that would conflict with designation in this WSA are unknown. The only known industrial proposals that could potentially involve the WSA are for tar sand development west of the WSA. Other sources and diversion points that would not involve the WSA are also being considered should tar sand development occur on a scale requiring large volumes of water. Given this uncertainty, alternatives were not developed based on possible future water diversion points.

16. *Comment:* How would water development for tar sand projects impact wilderness values in Desolation Canyon?

Response: To divert water within the WSA and transport it to tar sand mining areas to the west, road access, diversion structures, pipelines, and pumping stations might be expected. However, due to the uncertainties of future tar sand development, definite right-of-way routes or diversion points are not analyzed. Additional information may be found in the *Sunnyside Combined Hydrocarbon Lease Conversion Final EIS* (USDI, BLM, 1984b).

17. *Comment:* Would designation preclude water development for tar sand in upper Desolation Canyon?

Response: Refer to response to Comments No. 15 and 16. Water developments could be installed only if they were designed to meet wilderness protection criteria or pursuant to Presidential approval.

18. *Comment:* What impacts, both beneficial and adverse, would wilderness designation have on Rocky Mountain bighorn sheep?

Response: Wilderness designation would preserve bighorn sheep habitat by reducing human encroachment or development that would tend to render habitat unsuitable for this species. With designation, recreation use levels and types of use are not expected to change to the point of adversely affecting bighorn sheep populations.

19. *Comment:* The area has important oil and gas potential.

Response: Oil and gas potential for the WSA has been estimated at 10 to 60 million barrels of oil and 60 to 300 billion cubic feet of natural gas.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

Three alternatives were suggested during scoping. They were evaluated and eliminated from detailed study as explained below.

It was suggested that a 430-acre parcel in Rattlesnake Canyon be included. The parcel referred to is part of a KGS near the upper end of Rattlesnake Canyon. It is included under the All Wilderness Alternative, but was specifically excluded by BLM in the two Partial Wilderness Alternatives.

The larger of the two Partial Wilderness Alternatives was formulated with the intent of retaining the highest primitive recreation values, while not including those areas with a strong potential for the occurrence of uses not compatible with wilderness designation. The 430-acre area would represent less than a 0.2-percent change in the size of the larger Partial Wilderness Alternative. The change in terrain or recreation opportunities included within the designated wilderness would not be significant as a result of inclusion or exclusion of the parcel.

The smaller of the two Partial Wilderness Alternatives was formulated to allow for maximum mineral development and minimum conflict with wilderness.

The KGS is underlain by an identified oil and gas participating area. The leases held past expiration in this KGS are pre-FLPMA and, due to the identified participating area, are likely to be in effect for an extended period of time. Present primitive recreational use of the KGS area is low, although the area is scenic and has road access.

has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and, at that time, will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Volume I, Chapter 2 of this EIS.

8. *Comment:* The figures representing the acres for some grazing allotments inside the WSA have been decreased in the amended SSA. Is this a result of minor (unmentioned) boundary adjustments in the WSA or just a rounding-off of the acreage?

Response: WSA boundaries were changed between the first Draft SSA published in March 1983 and the amended draft published in November 1983. As a result, allotment acreages were refigured and some rounding-off also occurred. Also, since the original Draft SSA, some allotment boundaries have changed.

9. *Comment:* Wilderness designation would enhance the National Historic Landmark status of Desolation Canyon.

Response: The Historical Landmark values of Desolation Canyon would be protected because wilderness management would be consistent with the purpose of the landmark designation.

10. *Comment:* Would designation of Desolation Canyon WSA affect present recreational use (e.g., river running)?

Response: River recreation use would continue to be managed to facilitate river running. Current annual visitor use on the Green River would not be expected to change. Designation would ensure that the primitive, roadless setting is maintained in Desolation Canyon and in those side canyons within the designated area.

11. *Comment:* What impact on designation recommendations would inadvertently impairing developments (i.e., road construction/improvements) have in Desolation Canyon?

Response: BLM is required by law to ensure that WSAs' suitability for designation is not impaired unless a prior existing right can be demonstrated. BLM may require, within the framework of existing laws and regulations, reclamation or other corrective actions to restore impacted areas to a nonimpaired condition.

12. *Comment:* Wilderness designation would protect the Green River, which is a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic River System.

Response: Designation would be expected to preserve qualities that make the river segment eligible for study under Wild and Scenic Rivers Act criteria.

13. *Comment:* The boundary should have been extended to include the inventory boundary in the Horse Bench, Rock House Canyon, Big Swale, Xmas Canyon, Suluar Mesa, Tusher Canyon, and Rattlesnake Canyon areas.

Response: The boundary of the WSA was finalized after the *BLM Intensive Wilderness Inventory* and resolution of one appeal (refer to response to Comment No. 7).

14. *Comment:* There is concern regarding areas that were excluded from the recommendation to improve manageability: Little Pearl Wash, Jack Creek, and a small parcel near Rattlesnake Canyon.

Response: No location or drainage within the WSA is known to be named Little Pearl Wash. The name does not appear on any Geologic Survey quadrangle maps covering the WSA.

Portions of the Jack Creek drainage are included in the designated portion under the All Wilderness, large Partial Wilderness (242,000 acres), and small Partial Wilderness (143,350 acres) Alternatives. Under the All Wilderness Alternative, all of the Jack Creek drainage to the boundaries of the WSA is included. Under the large Partial Wilderness Alternative (242,000 acres), portions of the Jack Creek drainage outside the Green River corridor that overlap the Peters Point Oil and Gas Field and adjacent areas along the Jack Creek anticline are excluded. Exploration has occurred in this area as recently as 1981, and production occurred. Almost all of the leases covering the excluded area are pre-FLPMA with valid existing rights and are held by established production. Over time further development is considered likely. The impact of

DESOLATION CANYON WSA

The large Partial Wilderness Alternative (242,000 acres) was developed with the intent of retaining the highest primitive recreation values while excluding those areas with a strong potential for the occurrence of uses not compatible with wilderness designation (e.g., continued development of the KGS). The leases in this KGS are pre-FLPMA (Federal Land Policy and Management Act) and carry valid existing rights for further development. Present primitive recreational use of the KGS area is low, although the area is scenic and has road access. Areas with a similar setting in terms of topography and vegetation adjacent to the 430-acre parcel would be included in the designated portion of the WSA. Based on this, the 430-acre parcel was not included under this alternative.

The small Partial Wilderness Alternative (143,350 acres) places greater emphasis on expanding opportunities for oil and gas exploration. As part of a large area along the Uncompahgre Uplift in Grand County, the KGS was excluded from designation under this alternative.

2. *Comment:* The oil and gas potential of the WSA is ranked moderate by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be high. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

3. *Comment:* The occurrence of the sensitive plant species *Gaillardia flava* in or near this WSA should be considered in the decision-making process.

Response: The presence of *Gaillardia flava* and four other candidate or listed threatened or endangered plant species is noted in the Affected Environment section; potential impacts to these species are addressed in the Environmental Consequences sections for each alternative.

4. *Comment:* Much of the WSA along the Green River provides critically valued winter range for mule deer. How would wilderness designation impact this range?

Response: Designation would preserve critical winter range as identified in the Environmental Consequences section for the All Wilderness Alternative. While critical winter range is not limiting to present population levels, it would become more significant should populations increase the area's carrying capacity.

5. *Comment:* Salinity control activities on the lower Price River, flood control on the lower Green River, additional water storage potential on the Green River, and Ute Indian claims for water may require diversion facilities on the Green River.

Response: At present there are no known proposals for diversion facilities within the WSA. However, because the WSA includes two rivers, the potential for water projects exists and is addressed in this document.

6. *Comment:* Most of the KGSs and leases in the Jack Creek drainage could be managed to protect wilderness (e.g., directional oil drilling, etc.).

Response: The majority of the leases involved in this area are pre-FLPMA and carry prior existing rights. BLM is required to reasonably manage exploration within the constraints of rights conveyed by the leases. While there may be circumstances that would dictate directional drilling, it would be expected to be the exception rather than the rule.

7. *Comment:* About 15,000 acres in the Little Park Wash area were recommended unsuitable, yet coal reserves occur on only about 2,900 of the westernmost acres and have a low probability of development. The amended Site-Specific Analysis (SSA) changed the 2,900 to 8,000 acres, although the coal field is outside the additional area studied. Why?

Response: At present the Little Park area overlies about 8,000 acres of potentially recoverable coal. Based on available information covering depth of the coal and seam width, about 2,900 acres are underlain by moderate to high potential coal.

During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. The indication of suitability was made public prior to the EIS to obtain further input which

DESOLATION CANYON WSA

(UT-060-068A)

INTRODUCTION

General Description of the Area

Desolation Canyon Wilderness Study Area (WSA) includes about 450 square miles of lands along the Desolation and Gray Canyon portions of the Green River and tributary drainages from the Tavaputs Plateau to the river from Range Creek north to Rock House Canyon. The Price River and its tributary drainages from the point where the river enters the Book Cliffs to its confluence with the Green River also are included. The Green River forms the eastern boundary of the WSA with the exception of the southernmost portion which also includes Rattlesnake, Flat Nose George, Poverty, and portions of Coal Creek Canyons located east of the river and south of the Uintah and Ouray Indian Reservation.

The WSA is located in three counties: Carbon (78,360 acres), Emery (128,220 acres), and Grand (83,070 acres). The nearest community is Green River, Utah, located about 6 miles south of the WSA. The communities of East Carbon City and Sunnyside lie about 8 miles west of the WSA.

The configuration of the WSA is irregular, but approximates an L-shape. The WSA is about 50 miles long north to south, and ranges in width from about 1 to 28 miles. It includes approximately 289,650 acres of Federal land which is managed by the BLM Moab District's Price River and Grand Resource Areas. The WSA was originally reported to have 217,130 acres; the new acreage figure of 289,650 acres is attributable to Master Title Plat checks and addition of acreage in response to an appeal received during the *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980). In addition to public lands, 40 acres of private and 1,072.83 acres of split estate lands (Federal surface and State minerals) are located in the WSA.

The WSA is characterized by severe topographic relief, a variety of vegetation, and (in the north) frequent water. Elevation varies over 5,500 feet ranging from about 4,000 feet at the Green River to about 9,600 feet in the Roan Cliffs-Tavaputs Plateau areas along the west boundary. Ten geologic formations outcrop within the WSA. Surface features in the WSA include rugged, irregular ridges, steep V-shaped canyons (highlighted by Desolation and Gray Canyons), vertical rock walls, peaks, plateaus, pinnacles, balanced rocks, arches, buttresses, alcoves, caves, waterfalls, and rock water pockets.

Thirteen separate vegetation types occur in the WSA. Dominant vegetation in these types include cottonwood, willow, tamarisk, greasewood, salt-bush, blackbrush, pinyon pine, juniper, big sagebrush, mountain mahogany, Douglas fir, aspen, black sagebrush, and Gambel's oak.

Climate of the WSA ranges from arid to semiarid with average annual precipitation ranging from 8 to 20 inches, increasing from south to north with elevation. Half to slightly over half of the precipitation occurs during summer thunderstorms, while snowfall ranges from 15 to 100 inches. Average temperatures vary with elevation. At 9,600 feet, they range from 5 to 80 degrees Fahrenheit (F) and 20 to 95 degrees F at 4,000 feet.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the Price River and Grand Resource Areas are discussed in Volume I. Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in individual analyses for WSAs. Nineteen specific issues pertaining to the Desolation Canyon WSA were identified through formal public scoping (USDI, BLM, 1984a) and are responded to below:

1. *Comment:* The exclusion of the 430-acre parcel in Rattlesnake Canyon is unjustified. Several factors make development, which could impact the wilderness quality of the whole drainage, uncertain.

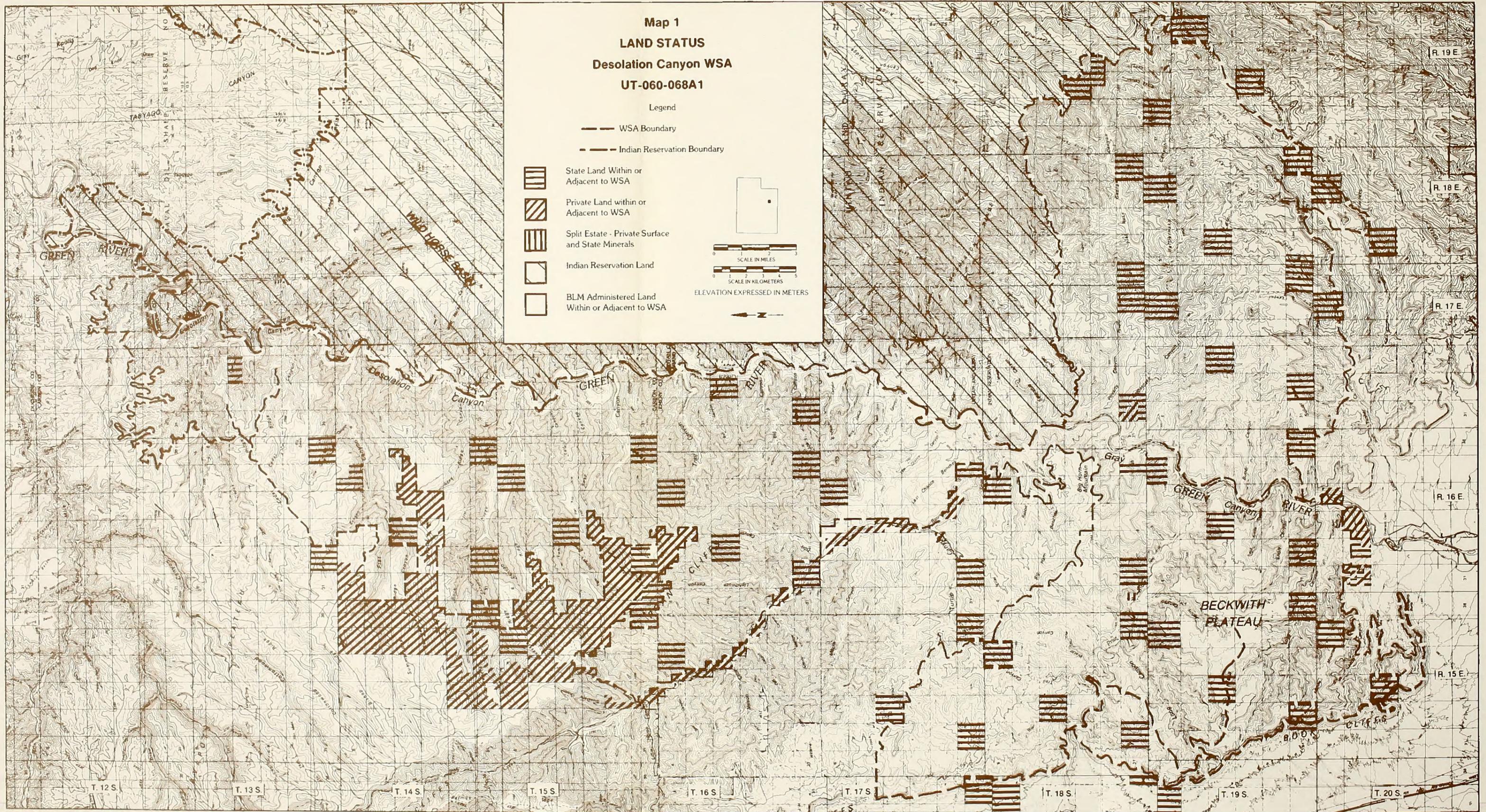
Response: The 430-acre parcel referenced is part of a Known Geologic Structure (KGS) near the head of Rattlesnake Canyon. It is included under the All Wilderness Alternative and excluded under the two Partial Wilderness Alternatives and the No Action Alternatives.



DESOLATION CANYON WSA

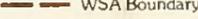
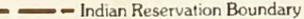
TABLE OF CONTENTS

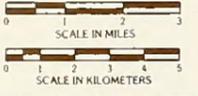
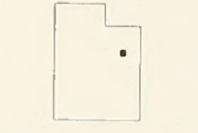
INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	4
Alternatives Considered and Eliminated from Detailed Study	4
Alternatives Analyzed	5
No Action Alternative	5
All Wilderness Alternative	6
Partial Wilderness Alternative (Proposed Action)	12
Partial Wilderness Alternative	16
Summary of Environmental Consequences	20
AFFECTED ENVIRONMENT	25
Air Quality	25
Geology	25
Soils	25
Vegetation	26
Water Resources	28
Mineral and Energy Resources	28
Wildlife	32
Forest Resources	34
Livestock and Wild Horses/Burros	34
Visual Resources	35
Cultural Resources	36
Recreation	36
Wilderness Values	39
Land Use Plans and Controls	41
Socioeconomics	42
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	44
Analysis Assumptions and Guidelines for All Alternatives	44
No Action Alternative	45
All Wilderness Alternative	51
Partial Wilderness Alternative (Proposed Action)	56
Partial Wilderness Alternative	62
BIBLIOGRAPHY	69



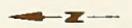
Map 1
LAND STATUS
Desolation Canyon WSA
UT-060-068A1

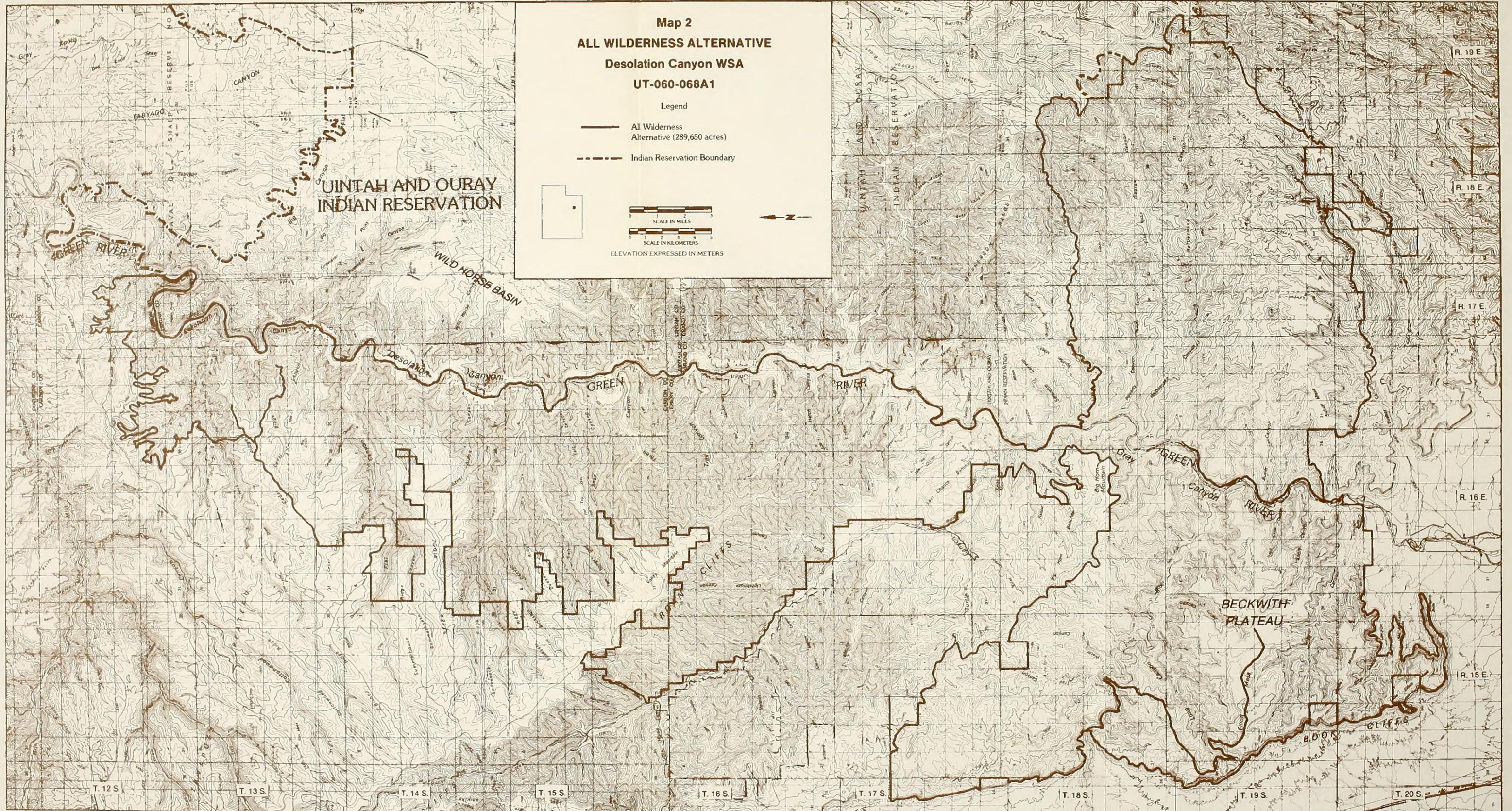
Legend

-  WSA Boundary
-  Indian Reservation Boundary
-  State Land Within or Adjacent to WSA
-  Private Land within or Adjacent to WSA
-  Split Estate - Private Surface and State Minerals
-  Indian Reservation Land
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS





DESOLATION CANYON WSA

assumed that wilderness management and resulting impacts on acquired State lands would be the same as those on adjacent Federal lands. Acreage figures and quantities (e.g., AUMs, number of leases, etc.) in this analysis are for Federal lands only.

The following are specific actions that would occur under this alternative:

- If the WSA were designated wilderness, all 289,650 acres would be withdrawn from mineral location. This represents an additional withdrawal of 161,850 acres since 127,800 acres are already withdrawn from mineral location by an oil shale withdrawal. Development work, extraction, and patenting would be allowed on that portion of the approximately 260 acres of 34 existing mining claims and any new claims located prior to wilderness designation if the claims are determined to be valid. Development of these claims would be regulated by the unnecessary or undue degradation guidelines with wilderness considerations (43 Code of Federal Regulations [CFR] 3809). The WSA would also be closed to new mineral leasing and sale. After designation, existing oil and gas leases, involving 206,200 acres, would be phased out upon expiration unless an oil or gas find in commercial quantities is shown. Coal, tar sand, or oil shale development would not be allowed in the wilderness area.
- Present domestic livestock grazing levels would continue as now authorized in the BLM planning documents. The 8,963 AUMs of forage in the WSA would remain available to livestock as presently allotted. Use and maintenance of range developments existing at the time of designation, as listed for the No Action Alternative, could continue in the same manner as in the past, based on practical necessity and reasonableness. After designation, new range developments would be allowed on a case-by-case basis, if determined necessary for the purposes of resource protection (range and/or wilderness), and the effective management of these resources, as long as certain criteria (refer to Appendix 1) are met to adequately protect wilderness values. It is assumed that the proposed spring development, small pond development, and diversion dam reconstruction would be allowed if carried out without heavy equipment. It is assumed that the two potential vegetation treatments on 1,620 acres would not be allowed. The existing wild horse herd of 25 animals would be allowed to remain.
- New water resource improvements or watershed activities not related to range or wildlife management would be allowed after designation only if these enhance wilderness values, correct conditions presenting imminent hazard to life or property, or are authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). Except for the livestock reservoirs, springs, and stream enclosure already mentioned, no water resource improvements are located in the Desolation Canyon WSA. A water diversion has been proposed on Rock Creek. The potential for a major reservoir has been studied for the Green River in the WSA, but no formal plans now exist. With wilderness designation, it is assumed that the water diversion and major reservoir construction on the Green River would not be allowed.
- New wildlife transplants or habitat improvements would be allowed after designation only if these are compatible with wilderness values. None are planned in this WSA.
- The entire WSA would be closed to ORV use except for: (1) those users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) occasional and short-term vehicular access approved by BLM for maintenance of approved range developments, including those mentioned above. About 5.5 miles of existing vehicular ways in the WSA would not be available for vehicular use, except as indicated above. Existing roads would be "cherry-stemmed" in four locations, totaling 29.5 miles: (1) Cedar Ridge, 1.5 miles; (2) the north side of Cedar Ridge Canyon, 3.0 miles; (3) along the east side of the Green River to Nefertiti Rapid, 7 miles; and (4) from Price River onto the Beckwith Plateau, 18 miles. These 29.5 miles of "cherry-stemmed" roads and about 18 miles of existing unpaved roads following the WSA boundary would remain open to vehicular travel. Vehicular use also would continue on roads that dead-end at the boundary of the WSA in nine locations.
- A specific Wilderness Management Plan would be developed to govern use and protection of the wilderness area. As part

DESOLATION CANYON WSA

of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to or dead-ended at the boundary of the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would extend up to 100 feet from the edge of the road surface. Low speed, wakeless downstream use of small out-board motors would be allowed to continue on the Green River along the east border of the WSA and through Gray Canyon.

- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any planned.
- Visual resources would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The Historical Landmark and Archaeological District would continue, as noted under the No Action Alternative.
- Measures to control fire, insects, noxious weeds, or disease within the area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity to gather information about natural resources in the area would be allowed by permit, provided it was accomplished in a manner compatible with the preservation of wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures, unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations. Motorized access would be limited to "cherry-stemmed" roads.
- Predator control would be allowed to protect threatened or endangered wildlife

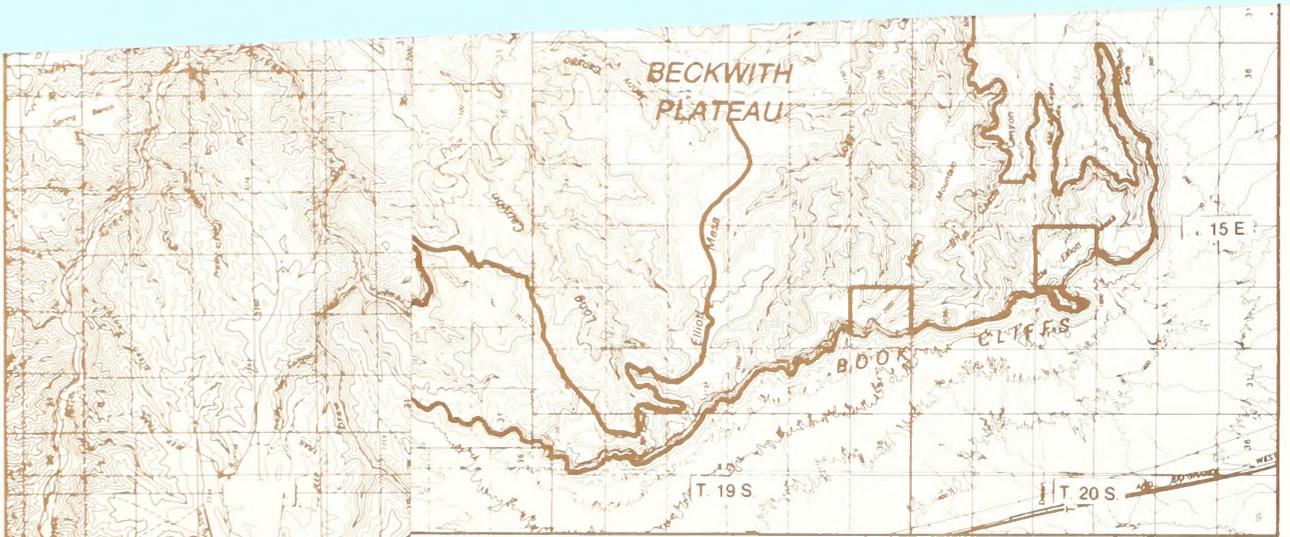
species or on a case-by-case basis to prevent special and serious losses of domestic livestock. This would be accomplished by methods directed at eliminating the offending individuals, while at the same time posing the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only under conditions that would ensure minimum disturbance to wilderness values.

PARTIAL WILDERNESS ALTERNATIVE (242,000 ACRES) (PROPOSED ACTION)

With this alternative, 241,160 acres of the Desolation Canyon WSA would be designated as wilderness (refer to Map 3). This alternative also includes an 840-acre addition to the WSA boundary in the upper part of the Rock Creek drainage not included in the All Wilderness Alternative. The objective of this alternative is to analyze as wilderness that portion of the WSA with the maximum primitive recreational opportunities while deleting those areas most likely to conflict with other uses or resources. The 48,490-acre area that would not be designated as wilderness would be managed in accordance with the BLM land use plans as described for the No Action Alternative. The 242,000-acre area that would be designated as wilderness would be managed in accordance with the BLM's "Wilderness Management Policy," as described in the All Wilderness Alternative. Upon designation, Federal acquisition of all or part of 37 sections of State land (22,285.7 acres) within the designated portion of the WSA and seven sections adjacent to the designated portion as requested by the State is likely and would be authorized by purchase or exchange. Approximately 1,072.83 acres of split estate lands are also included in the designated portion of the WSA. Should land transfers be made, it is assumed that impacts on acquired State lands would be the same as those on adjacent Federal lands and no specific analysis is given here. About 40 acres of private land would not be purchased or exchanged. Access would be maintained to the private land. The figures and acreages given for this alternative are for Federal lands only. Refer to Volume I for further information on State in-holdings.

A summary of specific actions for this action follows:

- The 242,000 acres that would be designated wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. About 35,450 acres of the



DESOLATION CANYON WSA

48,490-acre area not designated would be open to mineral location, while the remainder would remain closed due to the oil shale withdrawal. Development work, extraction, and patenting would be allowed to continue on the 260 acres of 34 existing mining claims and any new claims located prior to designation, provided these are valid. Development on these claims would be regulated by unnecessary or undue degradation guidelines with wilderness consideration. About 13,040 acres would remain withdrawn to mineral location due to oil shale withdrawal. Existing oil and gas leases, covering 163,500 acres in the area that would be designated wilderness, would be phased out upon expiration unless a find in commercial quantities is shown. The 42,700 acres under oil and gas lease in the nondesignated area could be developed without concern for wilderness values. The 48,490-acre area that would not be designated as wilderness would be managed under oil and gas leasing Category 1 (25 acres), Category 2 (44,635 acres), and Category 4 (3,830 acres). Also, within the nondesignated portion, coal exploration and development within an 8,000-acre area could occur. Tar sand and oil shale exploration and development could also occur within the nondesignated portion but is not likely.

- Domestic livestock grazing would continue at present levels (7,490 AUMs) in the 242,000-acre area that would be designated. Existing range developments (five improved springs and six fence segments) in the 242,000-acre area could be used and maintained in the same manner as in the past, based on practical necessity and reasonableness. New range developments would be allowed on a case-by-case basis, if determined necessary for the purposes of resource protection (range and/or wilderness) and the effective management of these resources, as long as wilderness protection criteria are met (refer to Appendix 1). The existing wild horse herd would be allowed to remain. In the 48,490 acres that would not be designated wilderness, use of 1,473 AUMs would continue as authorized in the applicable BLM planning documents. Existing range developments (two reservoirs) could be used and maintained without wilderness considerations. In the 48,490-acre area, new range developments could be developed without con-

cern for wilderness values. Potential vegetation treatments affecting 1,620 acres in the Green River and Little Park Allotments could occur, along with the proposed range developments.

- In the 242,000-acre designated area, new water resource developments or watershed activities not related to range or wildlife management would be allowed only if these enhance wilderness, correct conditions imminently hazardous to life or property, or are authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. It is assumed that major reservoir construction on the Green River would not be allowed if proposed in the future. In the remaining 48,490-acre area, water resource developments would be allowed without concern for wilderness values. None are proposed.
- In the 242,000-acre area that would be designated wilderness, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the 48,490-acre nondesignated area, wildlife transplants or habitat improvements would be allowed without concern for wilderness values. None are proposed.
- The 242,000-acre area that would be designated wilderness would be closed to ORV use. Within this area, vehicular activity would be allowed only by BLM permit for users with valid mineral rights or for maintenance of approved rangeland improvements. About 5.5 miles of existing vehicular ways in the 242,000-acre area would not be available for vehicular use, except if the criteria given in the All Wilderness Alternative were met. Existing roads, totaling 19.5 miles, would be “cherry-stemmed” in two locations: (1) north side of Cedar Ridge Canyon, 1.5 miles; and (2) Beckwith Plateau, 18 miles. The 48,490-acre nondesignated area would remain closed to ORV use except on existing roads and trails. The 10 miles of “cherry-stemmed” roads not in the designated area and about 14 miles of road forming the boundary, along with six roads dead-ended at the boundary of this alternative, would be open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 242,000-acre area that would be designated. As part of that plan, it

is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would extend from the edge of the road surface up to 100 feet. Low speed, wakeless downstream use of small outboard motors would be allowed to continue on the Green River.

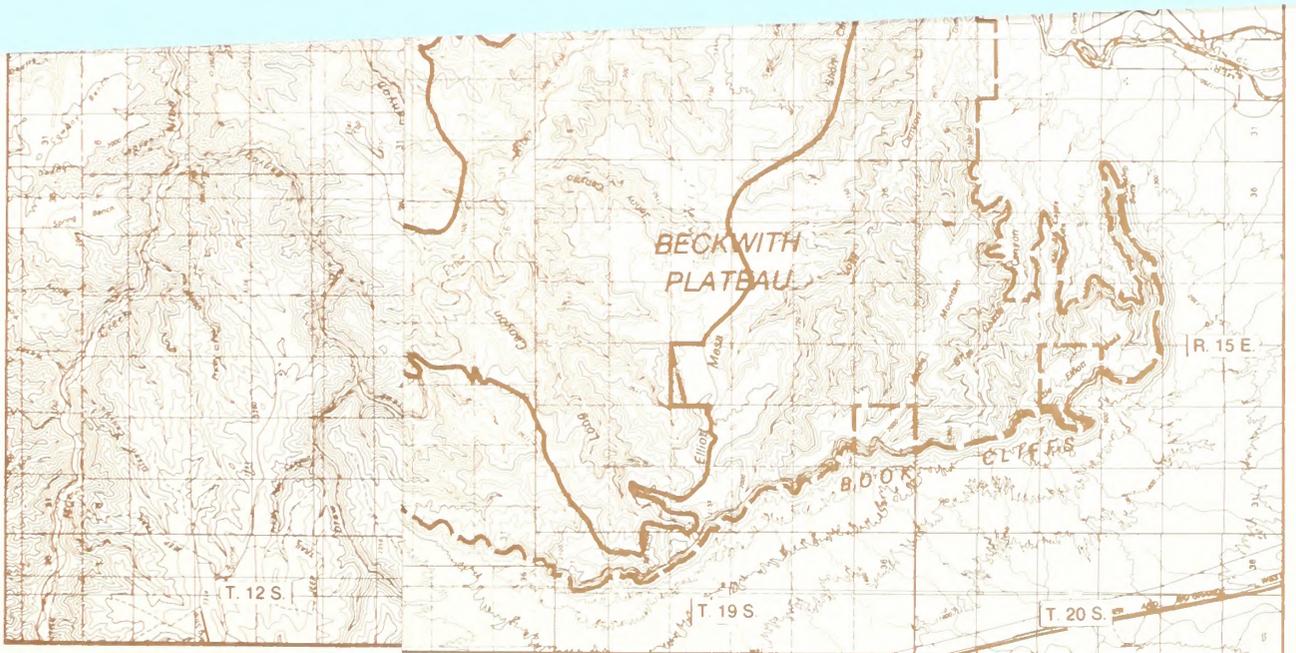
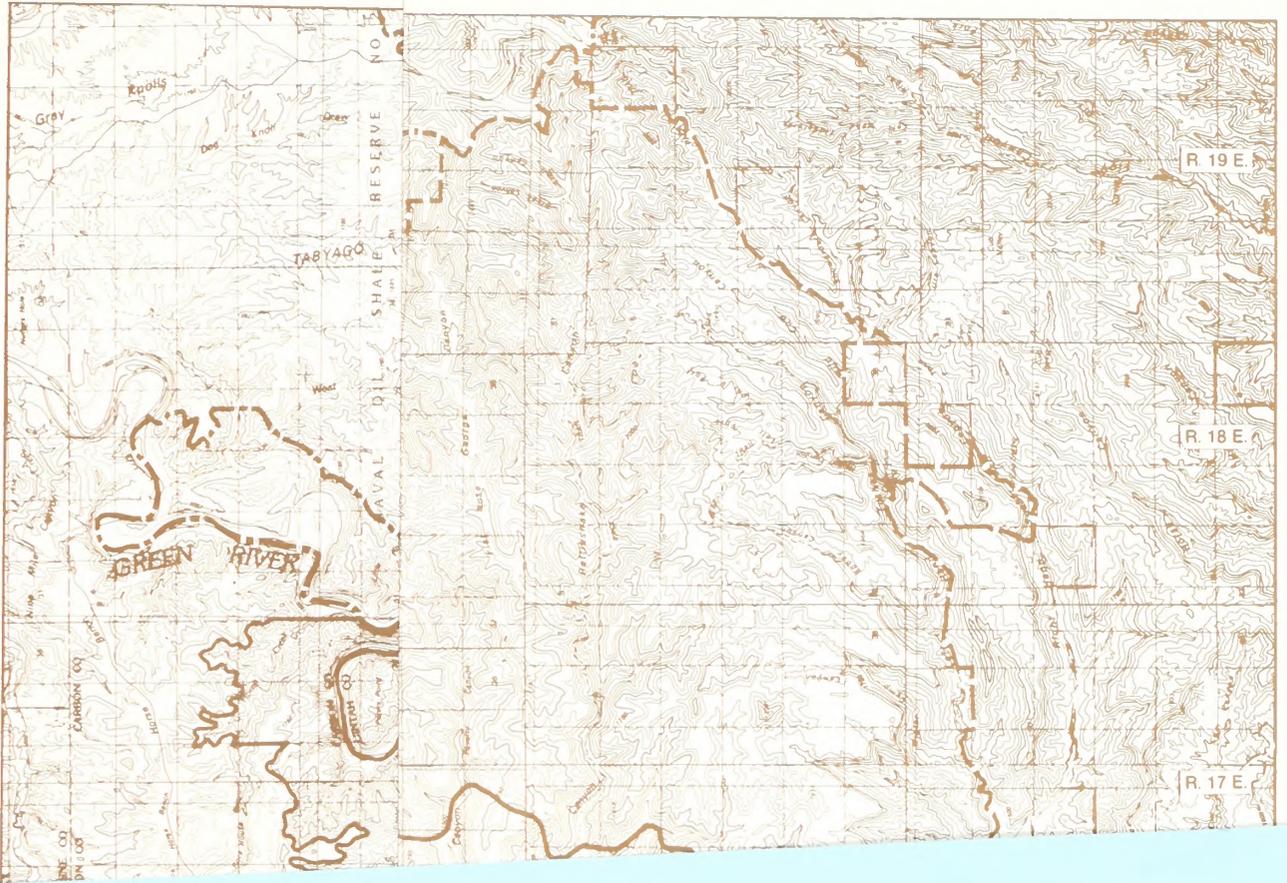
- Harvest of forest products in the 242,000-acre area that would be designated wilderness would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 48,490 acres would be open to forest product harvest. However, there is no harvest of forest products in the WSA at the present time, nor is any planned.
- Visual resources in the 242,000-acre area that would be designated would be managed in accordance with VRM Class I standards. The remaining nondesignated 48,490 acres would be managed as Class II (37,370 acres), Class III (3,600 acres) and Class IV (7,520 acres). Management of the Historical Landmark and Archaeological District would continue.
- Within the 242,000-acre area that would be designated wilderness, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that fire-fighting would be limited to hand and aerial techniques. On the remaining 48,490 acres that would not be designated, these measures could be taken in instances that threaten human life and property without concern for wilderness values.
- In the 242,000 acres that would be designated wilderness, any activity to gather information about natural resources would be allowed by permit, provided it was accomplished in a manner compatible with the preservation of wilderness values. Research and other studies would be conducted without use of motorized equipment

or construction of temporary or permanent structures unless no other feasible alternative exists. In the 48,490-acre area, activities to gather information about natural resources would be allowed by permit, provided these were accomplished in an environmentally sound manner.

- In the 242,000-acres that would be designated wilderness, hunter access would be limited to nonmotorized means except along "cherry-stemmed" roads. In the 48,490-acre area that would not be designated, hunting would be allowed subject to applicable State and Federal laws and regulations without limitations on vehicle use.
- In the 242,000-acre area that would be designated wilderness, predator control would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. This would be accomplished by methods directed at eliminating the offending individuals while at the same time posing the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be allowed. A predator control program would only be approved under conditions that would ensure minimum disturbance to wilderness values. In the 48,490-acre non-designated area, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock without consideration given to protection of wilderness values. Methods of control would be determined as appropriate.

PARTIAL WILDERNESS ALTERNATIVE (143,350 ACRES)

With this Partial Wilderness Alternative, 143,350 acres of the Desolation Canyon WSA would be designated as wilderness (refer to Map 4). The objective of this alternative is to identify and analyze that portion of the WSA with wilderness characteristics primarily associated with the side canyons of the Green River and to provide for maximum development of other resources in the WSA. The 146,300-acre area within the WSA that would not be designated wilderness would be managed in accordance with the BLM land use plans, as described in the No Action Alternative. The 143,350-acre area that would be designated as wilderness would be managed in accordance with BLM's "Wilderness Management Policy," as described in the All Wilderness Alternative. This



DESOLATION CANYON WSA

alternative would likely involve Federal acquisition of all or part of 18 sections of State land (9,654.16 acres) within the designated portion of the WSA and eight sections adjacent to the designated portion, as requested by the State. Approximately 320 acres of split estate lands are located in the designated portion of the WSA. It is assumed that wilderness management and resulting impacts on acquired State lands would be similar to those analyzed for Federal lands. No private lands would be involved. Figures and acreages for this alternative are for Federal lands only.

A summary of specific actions for this alternative follows:

- The 143,350 acres that would be designated wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Existing oil and gas leases, covering 116,800 acres, would be phased out upon expiration unless a find in commercial quantities occurs. The 146,300-acre designated area would be managed as leasing Category 1 (600 acres), Category 2 (141,250 acres), and Category 4 (4,450 acres) for existing and new leases. About 133,700 acres of this area would remain open to mineral location. Development work, extraction, and possible patent of 34 existing claims (260 acres) and future mining claims could occur if claims are valid. Development could occur without concern for wilderness values. The remaining 12,600 acres would remain closed to mineral location on oil shale withdrawal. Within the nondesignated area, coal exploration and development could occur on 8,000 acres. Tar sand and oil shale exploration and development could also occur within the nondesignated portion but is not considered likely.
- Domestic livestock grazing in the WSA would continue as presently authorized (4,435 AUMs) in the 143,350 acres that would be designated wilderness. Existing range developments (three improved springs and four fence segments) in the 143,350-acre area could continue to be maintained in the same manner as in the past, based on practical necessity and reasonableness. New range developments would be allowed on a case-by-case basis if determined necessary for the purposes of resource protection (range and/or wilderness) and the effective management of these resources, as long as wilderness protection criteria are met (refer to Appendix 1). None are now proposed. The existing wild horse herd would be allowed to remain. In the 146,300-acre area that would not be designated, use of 4,528 AUMs would continue as authorized in the applicable BLM planning documents. Existing range developments (two improved springs, two reservoirs, and two fence segments) could be used and maintained. New range developments could be developed without concern for wilderness values. Three are proposed. The two vegetation treatment areas affecting 1,620 acres also could be developed.
- In the 143,350-acre area that would be designated wilderness, new water resource developments or watershed activities not related to range management would be allowed only if these enhance wilderness, correct conditions imminently hazardous to health or property, or are authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. It is assumed that major reservoir construction on the Green River would not be allowed if proposed in the future. In the remaining 146,300-acre area, water resource developments would be allowed without concern for wilderness values. None are proposed.
- In the 143,350 acres that would be designated wilderness, wildlife transplants or habitat improvements would be allowed only if these are compatible with wilderness values. In the 146,300 acres that would not be designated, wildlife transplants or habitat improvements would be allowed without concern for wilderness values. None are proposed.
- The hills, ridges, and canyons comprising the 143,350 acres that would be designated wilderness would be closed to ORV use. Within this area, vehicular activity would be allowed only by BLM permit for users with valid mineral rights or for maintenance of approved rangeland improvements. Approximately 3.5 of the 5.5 miles of vehicular ways in the WSA are located in the proposed wilderness acreage. These 3.5 miles would not be available for vehicular use after designation, except if the criteria given in the All Wilderness Alternative were met. One existing road would be "cherry-stemmed" in the wilderness area. It is located on the north side of Cedar Ridge Canyon and extends into the wilderness

portion of the WSA about 1.5 miles. The 146,300-acre nondesignated area, including 2 miles of ways, would remain open to ORV use on existing roads and trails. The “cherry-stemmed” roads and roads forming the boundary of this alternative would be open to vehicular travel.

- A specific Wilderness Management Plan would be developed to govern use and protection of the 143,350 acres designated as wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would extend from the edge of the road surface up to 100 feet. Low speed, wakeless downstream use of small outboard motors would be allowed to continue on the Green River.
- Harvest of forest products in the 143,350 acres designated as wilderness would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 146,300 acres would be open to forest product harvest. However, there is no harvest in the WSA at the present time, nor is any planned.
- Visual resources on the 143,350 acres designated as wilderness would be managed in accordance with VRM Class I standards. The remaining 146,300 acres would be managed as Class II (132,640 acres), Class III (6,000 acres), and Class IV (7,660 acres). Management of the Historical Landmark and Archaeological District would continue.
- Within the 143,350-acre area, measures to control fire, insects, noxious weeds, or disease would be allowed only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse effect on wilderness values. It is assumed that firefighting would be limited to hand and aerial techniques. On the nondesignated 146,300-acre area, these measures could be taken in instances that threaten human life and property without concern for wilderness values.

- In the 143,350 acres that would be designated wilderness, any activity to gather information about natural resources would be allowed by permit, provided it was accomplished in a manner compatible with preservation of wilderness values. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures, unless no other feasible alternative existed. In the 146,300-acre area, any activities for the purpose of gathering information about natural resources would be allowed by permit, provided these were accomplished in an environmentally sound manner.
- In the 143,350 acres that would be designated wilderness, hunter access would be limited to nonmotorized means with the exception of the road along the north side of Cedar Ridge Canyon. In the nondesignated 146,300 acres, hunting would be allowed subject to applicable State and Federal laws and regulations without limitation on vehicle use.
- In the 143,350 acres that would be designated wilderness, predator control would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. This would be accomplished by methods directed at eliminating the offending individuals while at the same time posing the least possible threat to other animals or to wilderness visitors. Poison baits or cyanide guns would not be allowed in the area that would be designated wilderness. A predator control program would be approved only under conditions that would ensure minimum disturbance to wilderness values. In the 146,300 acres that would not be designated wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock without concern for wilderness values. Methods of control would be determined as appropriate.

Summary of Environmental Consequences

Table 1 presents the main environmental consequences resulting from implementation of the alternatives. Those resources that would be

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
DESOLATION CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (289,650 Acres)	Partial Wilderness Designation (242,000 Acres) (Proposed Action)
Geology	Subsidence and some surface settling and fracturing could result from extraction of coal and tar sand on about 1,250 acres.	Subsidence would not occur from this alternative.	Potential for subsidence would be about the same as under the No Action Alternative, affecting about 1,210 acres.
Soil	Soil loss from the WSA could increase by about 6 percent due to mineral and energy development.	Soil loss from the WSA could increase by about 0.1 percent due to mineral and energy development.	Soil loss due to mineral and energy development could increase by about 6.4 percent.
Water Resources	Flow from numerous springs in the WSA could decrease or cease because of subsidence resulting from mineral and energy development. Water quality flows and temperatures in the Green River could be affected by reservoir development.	This alternative would not affect water quality or quantity. A reservoir could not be built in the WSA.	Potential effects would be less than the No Action Alternative. A reservoir could not be built in the WSA.
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 50 to 70 million tons of coal, 3 million barrels of oil from tar sand, and 500 tons of uranium oxide. There is moderate potential recovery for 3 to 20 million barrels of oil and 18 to 100 billion cubic feet of natural gas. About 25 megawatts of hydroelectric power could be generated from construction of a dam and reservoir on the Green River.	Coal, tar sand, and hydropower would not be developed. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant. Moderate potential for recovery of up to 16.7 million barrels of oil and 83.3 billion cubic feet of natural gas would be foregone. The remaining 3.3 million barrels of recoverable oil and 16.7 billion cubic feet of recoverable gas held in KGS's could be produced. The potential for production of 25 mw of hydroelectric power would be lost.	Although likelihood is low, 50 to 70 million tons of coal, 3 million barrels of oil from tar sand, and 250 tons of uranium oxide could be recovered. About 250 tons of uranium oxide would be foregone, as would 25 mw of hydroelectric power. About 1.5 to 13 million barrels of oil and 9 to 65 billion cubic feet of natural gas could be recovered.

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
DESOLATION CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (289,650 Acres)	Partial Wilderness Designation (242,000 Acres) (Proposed Action)
Wildlife	<p>About 0.9 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Loss of carrying capacity for bighorn sheep could be as high as 117 animals. Loss of carrying capacity for deer could be as much as 402 animals on critical winter range and 49 on summer ranges, while carrying capacities for elk could be reduced by 110 on winter range and 201 on summer range. Wildlife could benefit from 1,620 acres of proposed land treatments.</p>	<p>Wildlife would benefit from solitude, but land treatments would not be allowed. Bighorn sheep, deer and elk population could reach the carrying capacity of the range.</p>	<p>Wildlife in the designated area would benefit from solitude. Less than 0.8 percent of the WSA could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat. Loss of carrying capacity for bighorn sheep could be as high as 63 animals. Loss of carrying capacities on critical winter ranges could be as high as 347 deer and 48 elk. Summer ranges would not be affected.</p>
Livestock	<p>Without reservoir development on the Green River, grazing of 8,963 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of one spring, one pond, reconstruction of one dam, and 1,620 acres of land treatments, could be constructed to produce 195 additional AUMs. With reservoir construction, 100 AUMs would be lost so that net gain with land treatments would be only 95 AUMs.</p>	<p>Grazing of 8,963 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed. The 1,620-acre land treatment and pond would not be allowed.</p>	<p>Grazing of 8,963 AUMs and maintenance of existing developments would continue. Proposed new developments would be in the undesignated portion and could be allowed. Net gain in AUMs would be as described for the No Action Alternative.</p>
Visual Resources	<p>The quality of visual resources could be impaired on up to 4,500 acres.</p>	<p>Visual quality could be impaired on 40 acres.</p>	<p>Visual quality could be impaired on 2,460 acres, including 10 acres in the designated portion. About 49 percent of the Class A scenery would be in the designated portion and would be protected by the reduced potential for disturbance.</p>

TABLE 1 (CONTINUED)
 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
 DESOLATION CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (289,650 Acres)	Partial Wilderness Designation (242,000 Acres) (Proposed Action)
Recreation	<p>ORV use would continue on 5.5 miles of ways. Overall recreational use could increase from the present 68,000 visitor days per year, including river recreation, to 75,920 over the next 20 years. This would be greater if a reservoir were built on the Green River. Up to 3,380 acres of mineral-related disturbance and 1,620 acres of land treatments could reduce the quality of primitive recreation, as would construction of a dam and reservoir.</p>	<p>The WSA, including 5.5 miles of ways, would be closed to ORV use. Recreational use could increase to up to 93,965 visitor days per year over the next 20 years due to publicity associated with wilderness designation.</p>	<p>The designated portion, including 5.5 miles of ways, would be closed to ORV use. Overall recreational use could increase to up to 92,360 visitor days over the next 20 years.</p>
Wilderness Values	<p>Wilderness values could be directly lost on up to 4,520 acres (about 1.5 percent of the WSA), which could affect values on a large portion of the WSA.</p>	<p>Wilderness values would be protected, except on up to 40 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.</p>	<p>In the designated area, wilderness values would be protected, except on 10 acres which could be disturbed by development of valid mineral rights. Additional impairment could be expected on 1.6 percent of the 146,300 acres not designated. Overall, wilderness values could be directly destroyed on 0.8 percent of the WSA. About 49 percent of the area meeting the standards for naturalness, 50 percent of the area meeting the standards for outstanding opportunities for solitude, and 49 percent of the area meeting the standards for outstanding opportunities for primitive recreation would be in the designated area and would be protected by reduced potential for disturbance.</p>

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
DESOLATION CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (289,650 Acres)	Partial Wilderness Designation (242,000 Acres) (Proposed Action)
Land Use Plans and Controls	<p>This alternative would be consistent with Carbon and Emery County zoning and the <i>Grand County Master Plan</i>, State of Utah plans and policies, and the current BLM Price River MFP. Proposed water diversion for irrigation and tar sand development and a potential hydroelectric dam and reservoir could be constructed.</p>	<p>This alternative would be consistent with Carbon County zoning but would not be consistent with Emery County zoning or the Grand County concept of multiple use. It would be consistent with State policy if lands were exchanged and would be consistent with the BLM Green River Management Plan. Designation would constitute amendments of the BLM Price River MFP and Grand RMP. Water diversion structures or the potential reservoir could not be built.</p>	<p>Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Emery and Grand Counties' plans and policies.</p> <p>Consistency would be about the same as for the 242,000-acre Partial Wilderness Alternative.</p>
Socio-economics	<p>Annual local sales of less than \$1,334,660 and Federal revenues of up to \$716,288 would continue, and could increase in the future due to increases in recreation. An overall increase of \$103,580 in Federal revenues per year could be derived from leasing of presently unleased areas. Additional forage from land treatments might result in an increase in local sales of up to \$3,900 and Federal grazing revenues of \$273. However, with reservoir construction, local sales could be decreased by \$2,000 annually and Federal grazing revenues could decrease by \$140 per year.</p>	<p>Annual local sales of less than \$1,334,660 and Federal revenues of up to \$12,548 would continue, but potential Federal revenues of up to \$722,580 from mineral leasing and the local benefits and Federal receipts from additional grazing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.</p>	<p>The effects of this alternative would be the same as for the 242,000-acre Partial Wilderness Alternative, except that annual Federal revenues from mineral leasing would be reduced by up to \$297,030.</p>

DESOLATION CANYON WSA

affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA is located in a Prevention of Significant Deterioration (PSD) Class II air quality attainment area as defined in the 1977 Clean Air Act Amendments, and currently meets National Air Quality Standards. The nearest Class I areas are Arches National Park, 24 air miles to the southeast, and Canyonlands National Park, about 50 air miles to the south. Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River and Moab areas, and the Uinta Basin. Point sources in the vicinity include powerplants in Castle Valley, and coal, oil, gas, and uranium exploration, production, and processing activities. Fugitive dust, the most significant air pollutant to the WSA, is intermittent depending mainly on localized activities and wind patterns. Visibility from promontories in the WSA remains good, ranging from 30 to 100 miles.

Geology

The WSA is located on the southern flanks of the Uinta Basin Section of the Colorado Plateau Physiographic Province that extends from the Book Cliffs to the Uinta Mountains. Elevations range from about 4,000 feet to over 9,600 feet. The Uncompahgre Uplift crosses the southern portion of the WSA and goes deeper to the south. Sedimentary rocks exposed at the surface in the WSA range from the Cretaceous to the Tertiary periods. The exposures represent approximately 9,500 feet of sedimentary strata between the Parachute Creek Member of the Green River Formation and the Mancos Shale.

From the north boundary south to Big Swale and the mouth of Flat Canyon, 80- to 250-foot tongues of interbedded outcrops consist of members of the Green River Formation, and 250- to 900-foot tongues of Wasatch Formation outcrop in buff, brown, red, black-stained, and gray-green sandstones and shales.

South from about Flat Canyon to the Roan Cliffs, the Green River cuts through an additional 2,000 feet of sandstones and shales of the Wasatch Formation, which is increasingly more down-warped toward the Uinta Basin to the north from the Roan Cliffs. These walls of Desolation Canyon and its tributary canyons, including the upper

reaches of Range Creek and canyons to its north, rise 3,000 to 5,000 feet above the river. The canyons meet the Parachute Creek Member of the Green River Formation, which caps the Tavaputs Plateau at elevations ranging from 8,000 to 9,600 feet. At the Green River, these canyons vary considerably in width. Some are open at their confluence (e.g., Three Canyon), while Calf Canyon, only 2 miles upstream from Three Canyon, presents a very narrow opening. Between the river and the plateau, canyons vary in steepness and length. Some rise the 3,000 to 5,000 feet quickly in 3 to 6 miles; others rise more gradually. Ridges separating these canyons are sharp, rugged, rocky, and irregular. The Roan Cliffs area at the south of this portion of the WSA is a very formidable series of broken cliffs, pinnacles, and spires blocked out from the red lower unit of the Wasatch Formation.

South from the base of these formidable cliffs topography changes dramatically with the change in formations exposed at the surface. A thin layer of Flagstaff Limestone marks the transition to the sandstones and shales of North Horn, Tusher, Farrer, Price River, and Blackhawk Formations to the south. Vertical relief between canyon bottoms and benches ranges from 1,000 to 2,000 feet. Elevations range from about 4,000 feet to just over 7,000 feet west of the Green River and from about 4,140 to 9,200 feet east of the river. To the south and west, the WSA is bounded by the 1,000-foot Book Cliffs comprised of the same formations. The cliffline is skirted at the base by Mancos talus slopes and badlands that are not within the WSA.

Soils

About 30 percent of the WSA is rock outcrop. Along the Green and Price Rivers, soils are generally deep to very deep alluvial bottom types manifested in sandy, gravelly, and loamy terraces or alkali flats. From the Roan Cliffs north, soils in the tributary canyon bottoms grade from deep loams to deep mountain loams, while to the south deeper soils in the drainages generally grade to shallow loams or rubble land. The upper reaches of Range Creek, Rattlesnake, and Flat Nose George Canyons are exceptions where deep loamy soils occur in the drainage bottoms.

In nearly 75 percent of the WSA, steep slopes influence both deep and shallow soils present. Soils on these slopes are protected by extremely gravelly, stony surfaces and/or dense vegetation. North of the Roan Cliffs, soils on the slopes near the river are shallow loams grading to deep mountain loams in 1 to 4 miles with the increase in elevation to the west. South of the Roan Cliffs at

DESOLATION CANYON WSA

the Green River shallow loams dominate, although some deeper mountain loams are found in the eastern extremities of Rattlesnake, Flat Nose George, and Coal Creek Canyons.

Agricultural lands north of the Town of Green River are adjacent to the southern boundary of the WSA at the base of the 1,000-foot Book Cliffs.

A high percentage of shallow soils and steep slopes (nearly 80 percent coverage by steep slopes) make much of the WSA sensitive to erosion when disturbed. Table 2 contains information on soil characteristics and land types in the WSA. Table 3 shows the erosion condition for the WSA.

Expected revegetation success in the WSA ranges from good to poor and can vary considerably throughout the WSA, depending on local conditions and soils. Slope, soil depth, aspect, and elevation are the major limiting factors affecting revegetation success.

Vegetation

Vegetation in the Desolation Canyon WSA consists of 13 major types. Existing vegetation types are identified in Table 4.

Significant variety in vegetation is found both in and within the types of vegetation due to the considerable range in elevation, moisture, and soils.

The pinyon-juniper woodland type is found at lower elevations in the WSA where soils are

shallow and slopes are moderate. Understory is scattered but commonly includes large shrubs such as Utah serviceberry, cliffrose, squawbush, curleaf mountain mahogany, birchleaf, and mountain mahogany. Also common are Mormon tea, snakeweed, black sagebrush, bullgrass, Salina wildrye, Indian ricegrass, galleta, slender-bush eriogonum, and scarlet gilia.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Shallow to very deep stony soils on steep mountainsides	45	130,343	1.0	10
Rock outcrop and rubbleland	30	86,895	0.0	0
Shallow loamy soils on sloping benches and ridges	20	57,930	1.0	5
Deep and very deep loamy soils on gently sloping valley floors and alluvial fans	5	14,482	0.1	1
Totals	100	289,650		

Source: Hansen, 1985.

Table 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20.0	0	0	0	0	0	0
High	10.0	0	0	0	45	130,342	1,303,425
Medium	5.0	0	0	0	20	57,930	289,650
Low	1.0	65	188,272	188,272	5	14,483	14,483
Very Low	0.1	5	14,483	1,448	0	0	0
None	0.0	30	86,895	0	30	86,895	0
Totals		100	289,650	189,720	100	289,650	1,607,557

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.65 under present conditions; 5.54 if disturbed.

DESOLATION CANYON WSA

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Juniper-Pinyon Woodland	76,400	26
Barren-Rock Outcrop	74,500	26
Pinyon-Juniper/Douglas Fir	58,600	20
Douglas Fir	27,500	10
Riparian	12,300	4
Salt Shrub	12,300	4
Salina Wildrye	12,300	4
Curleaf Mountain Mahogany	5,800	2
Black Sagebrush	3,700	1
Wyoming Big Sagebrush	3,000	1
Blackbrush	2,300	1
Gambel's Oak	700	Less than 1
Aspen	250	Less than 1
Total	289,650	100

Source: USDI, BLM, 1972 and 1981b.

The barren or rock outcrop type is found on steep, rocky soils. Vegetation is sparse but diverse. Common species are shadscale, nuttall saltbush, snakeweed, Mormon tea, cliffrose, Utah serviceberry, Utah juniper, pinyon pine, squawbush, galleta, Indian ricegrass, Salina wildrye, erigonum, gilia, pepperweed, and aster.

The pinyon-juniper/Douglas fir type is an intermediate type occurring on steep slopes between the pinyon-juniper woodland and the curleaf mountain mahogany and Douglas fir types. Common understory plants are Utah serviceberry, Oregon grape, snowberry, birchleaf mountain mahogany, locoweed, Salina wildrye, western wheatgrass, and squirreltail.

The Douglas fir type is a high mountain type occurring mainly on steep slopes. Other common species in this type are curleaf mountain mahogany, Utah juniper, squawbush, currant snowberry, bluegrass, and slender wheatgrass. Another high elevation mountain type is dominated by curleaf mountain mahogany. This type produces important browse for big game and is found on steep to moderate slopes near the top of the Tavaputs Plateau. Common understory plants are birchleaf mountain mahogany, snowberry, Utah serviceberry, big sagebrush, Oregon grape, rabbitbrush, locoweed, sedge, Salina wildrye, and wheatgrass.

The riparian type in the WSA includes five distinct ecological zones: tamarisk-greasewood complex, cottonwood-willow complex, tamarisk, greasewood, and big sagebrush. The first three types occur in the canyon bottoms with seasonally high water tables. The greasewood type is found on alkali flats and adjacent to moist or wet sites with low annual precipitation. The big sagebrush type is found along wet or moist drainages with deeper,

more productive soils including canyons between Jack Creek and Rain Canyon and Upper Range Creek, Rattlesnake, and Flat Nose George Canyons.

Tamarisk-dominated sites include rubber rabbitbrush, common reed, saltgrass, alkali sakaton, and pepperweed. In slightly drier sites, a tamarisk-greasewood complex is found. Common plants also found at these sites are cottonwood, Douglas fir, green rabbitbrush, cheatgrass, saltgrass, rush, sweet clover, pepperweed, seepweed, and lambs-quarter. Cottonwood-willow complex is found in small, narrow sites adjacent to rivers and streams. Other trees and shrubs common to the complex include tamarisk, squawbush, box elder, greasewood, and rabbitbrush. A diversity of forbs, grasses, horsetail, and rushes is also present.

On greasewood flats, understory plants include shadscale, prickly pear cactus, yellow beeplant, seepweed, globemallow, saltgrass, galleta, sand dropseed, and cheatgrass. In contrast, the big sagebrush type is more productive. Other common shrubs and trees are shadscale, snakeweed, Utah juniper, pinyon pine, prickly pear cactus, squawbush, snowberry, rubber rabbitbrush, and Utah serviceberry. Major forbs and grasses include erigonum, Russian thistle, locoweed, lupine, cheatgrass, sand dropseed, needle-and-thread grass, and Indian ricegrass. Riparian types are very valuable for recreation, wildlife, and range uses.

The salt shrub type is found on relatively flat areas at lower elevations. A variety of desert plants is common in this type and includes winterfat, Mormon tea, snakeweed, rabbitbrush, big sagebrush, galleta, Indian ricegrass, bullgrass, and needle-and-thread grass.

The Salina wildrye type is found on relatively flat areas on the mesas and benches of Suluar Mesa at elevations of about 5,200 to 6,400 feet. Pinyon and juniper trees are intermixed with the grasses and small brush species. Other grasses, shrubs, and forbs found in this type include bluebunch wheatgrass, Indian ricegrass, sand dropseed, globemallow, sagebrush, rabbitbrush, and Mormon tea.

Two sagebrush types are found at high elevations among the aspen and mountain mahogany. On the deep soils Wyoming big sagebrush dominates a type that includes Utah serviceberry, snowberry, and woods rose. Common understory plants include balsam root, lupine, aster, Salina wildrye, western wheatgrass, bluegrass, needle grass, and thurber fescue. On shallower soils, black sagebrush dominates with associated species commonly found in the Wyoming big sagebrush type.

DESOLATION CANYON WSA

Three types, occurring in localized areas, contribute to the diversity of vegetation found in the WSA. A blackbrush type is found between the Green River and the Big Horn Benches. A Gambel's oak type is found in moist areas at the heads of the two upper forks of Three Canyon and at the head of Flat Nose George Canyon. Four aspen stands are found within the WSA, three on Buckskin and Van Duesen Ridges and one on Flat Top Mountain.

Four candidate species under status review by the Fish and Wildlife Service (FWS) (*Gailardia flava*, *Penstemon grahamii*, *Psorathanmus polyadenius* var. *jonesii*, and *Hedysarium occidentale* var. *canone*) and *Sclerocactus glaucus*, a threatened plant species, occur in or near the WSA.

The Desolation Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research due to its importance in determining the biological potential of an area.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-Pinyon Woodland	144,825	50
Saltbush-Greasewood	86,895	30
Douglas Fir Forest	57,930	20

Source: USDI, Geological Survey, 1978.

Water Resources

The Green River is the major water source of the WSA. Other significant surface sources include Price River, Range Creek, Coal Creek, Rattlesnake Creek, and Jack Creek. Drainages of the WSA are all tributary to the Green and Price Rivers. The WSA extends north to south for about 68 river miles. Total live water stream mileage within the WSA is between 150 and 200 miles. There also are numerous seeps and springs. The relative abundance of water between Jack Creek and Range Creek is due to a substantial aquifer underlying the Tavaputs Plateau.

Consumptive use is by livestock, wildlife, and recreationists. Domestic and industrial uses (exploration for tar sand or oil and gas) occur on some drainages outside the WSA. Recreational

floatboating and habitat for fish are the major nonconsumptive uses within the WSA.

Salinity is the major water quality concern. Total dissolved solids (TSD) in the Green River at Jensen, Utah, 102 river miles north of the WSA, averaged 347 milligrams per liter (mg/l) between 1966 and 1975. During the same period, the average concentration at Green River, Utah, was 474 mg/l. Most of the increase is attributed to the Price River, which had an average of 2,298 mg/l for the same period. The Price River is the single largest contributor of salt to the Colorado River system. Another water quality concern is coliform bacteria in water sources along the Green River used for human consumption. This is most critical in areas of heavier livestock use.

Existing water developments in the WSA include five spring developments, two livestock reservoirs, and small erosion control structures of natural material in Rock Creek. One spring development and one livestock reservoir are proposed. A small diversion dam to periodically divert irrigation water has also been proposed for Rock Creek, and applications for permits to divert Green River water for tar sand development have been made. Although proposals to construct a dam in or near the WSA have been identified in the past, no plans to do so are currently active. A potential dam and reservoir site has been identified by the Bureau of Reclamation on the Green River downstream of its confluence with the Price River. The reservoir site includes about 2,000 acres based on a 100-foot-high dam.

Mineral and Energy Resources

The BLM, in cooperation with the U.S. Department of Energy had each WSA in Utah assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system. The energy and mineral resource rating summary for this WSA is given in Table 6.

An overall importance rating (OIR) of 4 was assigned to the Desolation Canyon WSA by SAI (1982). The OIR rating is given on a scale of 1 to 4, where 4 is equated with high mineral importance. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

The OIR assigned by SAI (1982) was based on their evaluation of coal, hydroelectric, and oil and

DESOLATION CANYON WSA

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c3	10 to 60 million barrels of oil; 60 to 300 billion cubic feet of natural gas
Tar Sand	f2	c3	Less than 10 million barrels
Oil Shale	f2	c4	23.5 million barrels
Uranium/ Vanadium	f2	c2	Less than 500 tons
Coal	f4	c4	105 to 140 million tons
Geothermal	f1	c3	None
Hydropower	f4	c4	Greater than 25 megawatts
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c3	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

gas potentials, and the large size of the tract evaluated by SAI. While the rating within the WSA applies to coal reserves in Little Park and to hydroelectric potential, it should not be applied to oil and gas or other mineral potentials uniformly across the WSA. The tract evaluated by SAI is 18 percent (52,510 acres) larger than the WSA and includes additional areas producing oil and gas. It is not known how the differences in size and configuration of the WSA have affected the summary rating.

If the Desolation Canyon WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

Mineral production has occurred in the vicinity of the WSA for coal, oil and gas, a limited amount of tar sand, and uranium. Current mineral production from the WSA is for gas produced from the Peters Point Field^d in the northern portion of the WSA.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to

supply military, industrial, and essential civilian needs during a national emergency, but that are not found or produced in the United States in sufficient quantity to meet such needs. There are no materials listed as strategic or critical within the WSA (Federal Emergency Management Agency, 1983).

Several mineral-related designations have been made for areas in the WSA and are summarized in Table 7.

TABLE 7
Mineral-Related Designations In and Around the WSA

	Total Acres	Approximate Acres in the WSA
Oil Shale Withdrawal	2,757,310	127,800
Greater Jack Canyon KGS ¹	70,822	10,390
KGS in Rattlesnake Canyon	1,788	430
Sunnyside STSA	157,445	1,640

Source: USDI, BLM, 1975.

¹Peters Point and Jack Canyon KGSs were expanded and combined with other KGSs to form the Greater Jack Canyon KGS in January 1984.

An oil shale withdrawal established in the 1920s covers 127,800 acres of the WSA. In addition to prohibiting oil shale development, the withdrawal also prohibits mineral location. Leasable minerals are not affected. This withdrawal has been proposed for revocation and the proposal is currently under review. The KGSs associated with oil and gas and the Sunnyside Special Tar Sand Area (STSA) associated with tar sand are discussed below by resource.

LEASABLE MINERALS

Oil and Gas

The oil and gas potential of the WSA has been rated moderate. This rating indicates a potential for 10 to 60 million barrels of oil and 60 to 300 billion cubic feet of gas in-place. Three to 20 million barrels of oil and 18 to 100 billion cubic feet of gas are considered recoverable. Topography in about 65 percent of the WSA is a severe constraint on exploration. Increased costs and limits to access and drilling locations diminish the likelihood for development.

Rocks exposed at the surface or underlying the WSA have produced moderate amounts of gas and smaller amounts of oil from the Peters Point Field and other fields in eastern Utah. Producing amounts of oil and gas are found only where an adequate petroleum source, porous and permeable rock, and a trap (formed by geologic structural

DESOLATION CANYON WSA

or stratigraphic conditions that contain the petroleum), are present.

Gas is produced from one well within the WSA in the Greater Jack Canyon KGS (No 5-14). This well has produced a total of 210.4 million cubic feet of gas (as of April 1985). It was drilled in 1982, and is continuing to produce.

There are two wells along the WSA boundary, also in the Greater Jack Canyon KGS, that are producing gas. Peters Point 3 is at the end of a "cherry-stemmed" road on Cedar Ridge and Peters Point 4 is to the west, also along Cedar Ridge road. Peters Point 3, drilled in 1980, produced 186,000 cubic feet of natural gas in 1983. Peters Point 4, drilled in 1954, produced 26,000 cubic feet of natural gas in 1980. Both wells are currently producing.

Three other wells have been drilled along "cherry-stems" in the WSA. None of these have produced oil or gas. Production pipelines in the Peters Point Oil and Gas Field vicinity run along about 5 miles of the WSA boundary, and production facilities are located at the three producing wells discussed above. A separator is located along the pipeline in Jack Creek Canyon.

Eighty-seven wells have been drilled within 6 miles of the WSA. The structural and stratigraphic conditions under which production occurs are related to intertonguing between the Wasatch and Green River Formations and influence of the Jack Creek anticline potential that trends northwest from the anticline. Cumulative production to date from the Peters Point and Jack Canyon Fields (1952 to May 1983) is 2.9 billion cubic feet of gas and 14,000 barrels of oil. The highest probability for occurrences adequate for commercial production occurs along the Jack Creek anticline. Some probability also is assigned for locations along the Uncompahgre Uplift, based on the locations of shut-in wells in Emery and Grand Counties, although some of the other wells along the Uplift have not produced any significant petroleum shows. Occurrences and exploration to date around the WSA suggest a high probability for small gas fields.

In summary, present data do not fully define structural or stratigraphic conditions throughout the WSA. The sampling of data now available and exploration to date have identified two areas within the WSA that appear most favorable for production. Other portions of the WSA are known to have favorable host rocks for petroleum but favorable structural or stratigraphic conditions have not been found. Exploration, seismic and drilling, has been limited in much of the WSA.

Topography in much of the WSA is a major limiting factor to potential well locations, and an extreme constraint in many northern portions of the WSA. Most reservoirs would probably occur as small pockets of gas, although the size of the WSA increases the potential for a number of small undiscovered reservoirs.

Oil and gas leasing categories for the WSA are depicted in Table 8.

TABLE 8
Oil and Gas Leasing Categories

Category	Proposed Acres	Percent of WSA
1. Open to Leasing	600	Less than 1
2. Open with special stipulations	240,140	87
3. Open with no surface occupancy	120	Less than 1
4. No leasing	48,790	12

Source: USDI, BLM, 1975.

Areas where special stipulations protect watershed and wildlife are classified Category 2 (standard and special stipulations). Category 3 (no surface occupancy) areas occur in the upper reaches of Rock Creek Canyon. Category 4 (no leasing) areas occur along the Green River in Desolation and Gray Canyons. This category was identified in the River Management Plan to protect recreation uses and values in a 0.5- to 2-mile-wide corridor along Desolation and Gray Canyons. About 71 percent of the WSA was under lease as of December 1984.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development. Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be non-impairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydro-mulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA leases.

DESOLATION CANYON WSA

Leases that are producing oil or gas prior to their original expiration date or that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases. Table 9 refers to existing leases in the WSA.

TABLE 9
Leasing Status

Type of Lease	Approximate WSA Acres	Percent of WSA
Pre-FLPMA	63,600	22
Post-FLPMA	142,600	49
Not Leased	83,450	29

Source: USDI, BLM, 1975.

Lease holders and leases not under production or held by established production are constantly subject to change. Portions of four oil and gas units fall within the WSA. An oil and gas unit is formed from leases grouped together in a block for the purpose of exploration and/or production. All leases within the unit may be held by diligent development or production on any lease within the unit. The units are listed in Table 10.

TABLE 10
Oil and Gas Lease Units

Unit	Total Acres	Approximate WSA Acres
Peters Point	10,096	5,350
Rattlesnake	39,779	29,000
Trial Canyon	31,768	19,300
Range Creek	15,625	2,100

Source: USDI, BLM, 1975.

Coal

A high favorability rating assigned to the WSA indicating the presence of large tonnages of coal in minable beds primarily in the Blackhawk Formation. Coal is known to be present and potentially recoverable under about 8,000 acres of the WSA. High to moderate potential coal from the Blackhawk Formation underlies 2,900 of the 8,000 acres. The coal beds of the 8,000-acre deposit, are more than 4 feet thick and occur less than 3,000 feet below the surface along the Book Cliffs in the Little Park vicinity. The high to moderate potential area is estimated to contain 105 to 140 million tons of in-place coal, of which 50 to 70 million tons would be recoverable. Underground mining

methods would be used, with exploration activities and surface facilities necessary within the WSA. None of the coal in the WSA is currently under lease. Another 100,000 acres of the WSA are underlain by mainly thin-bedded, low-grade coal, most of which is more than 3,000 feet below the surface and is not considered a recoverable resource.

Tar Sand

The WSA is located along the eastern edge of the Sunnyside STSA, with about 1,640 acres of the STSA extending into the WSA. The Sunnyside tar sand is considered the largest, best exposed, oil-impregnated sandstone deposit found in the southwestern Uinta Basin. None of the higher quality tar sand likely to be producible is within the WSA. The higher quality deposits outcrop 3 to 10 miles east or northeast of the WSA. Estimates of total reserves for the entire Sunnyside STSA are between 3.5 and 4 billion barrels of oil, while maximum reserves in the WSA are estimated at less than 10 million barrels (SAI, 1982). Less than 3 million barrels would be considered recoverable from the WSA. Tar sand in the WSA lies as much as 1,000 feet under the surface. Although potential exists in this area, based on present drilling data from near the WSA, the WSA's location outside areas of outcrop or probable reserves, and a possibility that most of the tar sand is eroded away within the deeper canyons of the WSA, tar sand development in the WSA is not likely to occur.

One identified competitive lease tract, Sunnyside No. 9, overlaps about 200 acres of the WSA. The tract was developed during preparation of the *Utah Combined Hydrocarbon Leasing Regional EIS* (USDI, BLM, 1984a). To date, no interest has been expressed in developing this tract.

Oil Shale

The low favorability rating was assigned to the WSA due to the thin, low grade oil shale beds found in the vicinity of the WSA, particularly relative to oil shale in other areas of the Uinta Basin. Oil shale beds in the Uinta Basin are estimated to contain 320 billion barrels in zones up to 700 feet thick. Oil shale deposits of potential commercial interest occur in the Mahogany Beds at the base of the Parachute Member (Green River Formation), which is almost entirely outside the WSA. Approximately 1,800 acres in small pockets on Cedar Ridge and above the upper forks of Jack Creek are within the WSA and thought to contain at least 15 gallons of oil per ton in deposits at least 15 feet thick.

Exploration or production of oil shale has not occurred in or near the WSA. All historical activity concerned with oil shale has taken place to the north and east where oil shale concentration is much greater. Potential reserves within the WSA are estimated at a maximum of 23.5 million barrels, based on total acreage and oil shale grade (7 million barrels are considered recoverable). No leases currently exist. Less than 0.002 percent of the Uinta Basin oil shale reserves are present in the WSA. The moderate to low favorability of the deposit, its small size, and its isolation from the richest deposits in the Uinta Basin northeast of the WSA and east of the Green River reduce viability of the deposit and there is essentially no potential for development of the resource in the WSA, even though about 127,800 acres of the WSA are included in an oil shale withdrawal established in the 1920s. It is likely that the withdrawal will eventually be revoked.

Hydropower

A high favorability rating was assigned based on a potential to produce at least 25 megawatts of power. Hydropower is evaluated based on potential damsites on the Green River. Six potential sites have been identified over a number of years associated with potential for power generation and/or agricultural water. Construction on one site, at Coal Creek, actually began but was abandoned by 1915. More recent proposals include the Desolation and Rattlesnake sites identified by the Bureau of Reclamation in 1942. In 1971, the Bureau of Reclamation requested that withdrawal be lifted for these sites because they were no longer needed. This withdrawal has been revoked as the two sites are no longer considered likely to be constructed. Other overlapping withdrawals for power sites and power projects, most of which are over 30 years old, are presently being reviewed to determine if they should be revoked. With the exception of one site, they are not expected to indicate high hydroelectric potential. One potential site remains, located near the confluence of the Green and Price Rivers. Construction of this reservoir would inundate a total of about 200 acres of the Green and Price River Canyons and would extend north along about 10.5 miles of the Green River to about the base of the Roan Cliffs. The dam would be about 100 feet in height and could potentially produce about 25 megawatts of power. No current proposal or expressed interest in this site is known to exist. Utah Power and Light Company has expressed interest in a reservoir on the Green River, although no plans have been finalized or formally presented.

Geothermal

No potential was assigned for geothermal resources within the WSA. Any potential that might be present would be expected to occur as deep-seated, low-temperature thermal waters.

LOCATABLE MINERALS

The low rating was assigned for uranium because the Wasatch Formation is considered only marginally favorable for occurrence, based on small prospects located in the Book Cliffs of Grand County. No potential for copper, manganese, and potash exists for the WSA.

Potential for uranium or other minerals for which mining claims might be located within the WSA is poor. Mining claims (34) cover 260 acres of the WSA along the Book Cliffs north of the Town of Green River. The major part of the claim group involved is outside the WSA. The target of these claims is probably the Morrison Formation 3,000 to 5,500 feet below the surface. Formations known to be favorable for uranium (Morrison and Chinle) generally range from 3,000 to 12,000 feet below the WSA's surface. There are three small deposits known in the Wasatch Formation in Rattlesnake Canyon. One has produced ore, but only 92 pounds. Total ore grade material for each of these deposits is estimated at 500 tons or less.

SALABLE MINERALS

Salable minerals in the WSA include sand, gravel, and rock. However, due to difficult access and more favorable locations elsewhere, no demand exists for salable minerals in the WSA.

Wildlife

A large diversity of habitats is present in the WSA, including riparian along stream and river bottoms in about 4 percent of the WSA. Variety in vegetation (including highly productive types), extensive cliff and talus habitat, considerable variation in elevation, and overall ruggedness have resulted in a wide variety of wildlife species. Economically important species include the Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, black-footed ferret, blue grouse, ruffed grouse, golden eagle, prairie falcon, Cooper's hawk, goshawk, American kestrel, red-tail hawk, channel catfish, rainbow trout, and brown trout. Federally endangered species present in the WSA include the bald eagle, peregrine falcon, bony-tail chub, humpback chub, and Colorado squawfish.

Twenty-two Rocky Mountain bighorn sheep were reintroduced on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek

DESOLATION CANYON WSA

across the river from the WSA in 1970 and 1973. They are reoccupying historical range in and around Desolation Canyon, including the WSA. In all, there are 11 recorded sightings by the Utah Division of Wildlife Resources (UWDR) and BLM in the vicinity of the WSA. These are believed to represent two herds. Portions of range for each of these herds are found in the WSA. Population and range data for the WSA appear in Table 11.

**TABLE 11
Rocky Mountain Bighorn Sheep
Population and Range Data**

Herd	Present Total Population	Prior Stable Carrying Capacity	Acres of Range in WSA	Percent of Total Range in WSA
Range Creek	59	1,330	192,800	81
Book Cliffs	27	608	88,125	Uncertain

Source: USDI, BLM, 1972 and 1981b.

Mule deer winter, critical winter, summer, and yearlong range all occur in the WSA. The most heavily used critical winter ranges are in the canyon bottoms along the Green River, in Range Creek, and in Little Park. The WSA's support for populations of deer by herd unit, seasonal range type, and carrying capacity are shown in Table 12.

**TABLE 12
Deer Herd Units in WSA**

	Herd Unit	Present Total Population	Carrying Capacity	Acres of Range in the WSA	Percent of Total Range in WSA
Critical Winter Range	27B	1,440	3,239	64,788	53
Summer Range	27B	59	1,399	37,767	15
Summer Range	28	334	792	21,382	6

Source: USDI, BLM, 1972 and 1981b.

Elk populations in the Range Creek and Book Cliffs herds are slowly being reestablished. Present populations of elk, carrying capacities, range within the WSA, and percentage of total herd range within the WSA are given in Table 13.

Mountain lion and black bear are both common to the entire WSA, although accurate counts or population estimates are not available. Mountain lion distributions are closely associated with mule deer and rely heavily on them for prey. The WSA includes 48 percent of the habitat for these groups.

**TABLE 13
Range Creek and Book Cliffs Elk Data**

	Herd Unit	Present Population	Carrying Capacity	Acres of Range in the WSA	Percent of Total Range in WSA
Winter Range	Range Creek	23	370	108,010	34
Summer Range	Range Creek	4	69	6,885	7
Winter Range	Book Cliffs	10	162	47,310	2
Summer Range	Book Cliffs	3	49	4,940	Less than 1

Source: USDI, BLM, 1972 and 1981b.

Blue grouse, ruffed grouse, and chukar partridge are the major upland game birds present. Blue and ruffed grouse are found in the upper elevations of the WSA on mule deer summer range. Chukar occur at low elevations where permanent water is available.

No raptor surveys have been completed for most of the WSA. One systematic survey of 6 miles of cliff within the WSA along the Book Cliffs by the FWS identified five nests. Casual survey has identified 12 more nests in the remainder of the WSA. Potentially nesting raptors occur throughout the WSA and include golden eagle (a BLM sensitive species), prairie falcon, Cooper's hawk, goshawk, American kestrel, red-tail hawk, and peregrine falcon. The peregrine falcon, an endangered species, was not identified by the FWS as occurring in the WSA by the FWS; however, four sightings within the WSA and two near the WSA have been documented, and suitable nesting habitat is abundant (estimated at 66,500 acres). The bald eagle, also an endangered species, uses the WSA during winter migration. Eight bald eagles were identified in 1984 and 19 in 1985. Indications are that use is mostly concentrated between Rock Creek and Range Creek on the Green River.

Birds present in the WSA are numerous and diverse, with 245 bird species potentially present. Confirmed observations of 83 of these species were made over the 1981 and 1982 summer seasons.

Several desirable fish species are present in the WSA. Channel catfish are abundant in the Green River. Rainbow and brown trout are present in Rock Creek, which provides a high quality fishery. Three Federally endangered species of fish

DESOLATION CANYON WSA

(Colorado squawfish, humpback chub, and bony-tail chub) and one candidate species under status review (razorback sucker) are present in the Green River along the unaltered stretches of river within the WSA.

The FWS has also identified the black-footed ferret (an endangered species) and six candidate species under status review (ferruginous hawk, Western snowy plover, white-faced ibis, long-billed curlew, Southern spotted oil, and Western yellow-billed cuckoo) as occurring or potentially occurring in the WSA. Unconfirmed sightings of the black-footed ferret have occurred near the WSA east and west of the Town of Green River and along the Price River between Woodside and the WSA. However, no habitat areas are known within the WSA.

Other common wildlife present include cottontail rabbit, bobcat, coyote, ringtail cat, gray fox, a variety of rodents, and some reptiles, such as the side-blotched lizard and the midget-faded rattlesnake.

Forest Resources

Production of forest products has not occurred in the WSA. Adequate volumes for timber harvest could produce limited amounts of pulp wood, saw

timber, firewood, fenceposts, or Christmas trees. About 162,600 acres in the WSA contain pinyon, juniper, or Douglas fir. Slopes, however, are prohibitive in most of the WSA, accessibility is very poor, and distance to a mill is not favorable. More suitable stands are available elsewhere. No commercial or noncommercial interest has been expressed in any of the forest resources in the WSA. The forested area is treated as nonproductive and noncommercial timber.

Livestock and Wild Horses/Burros

The WSA contains all or portions of 15 grazing allotments, as listed in Tables 14 and 15.

There are seven water developments within the WSA. Two developed springs are located in the Rock Creek Allotment, one at the head of Rock Creek, and one near Van Duesen Ridge. One developed spring (pipeline and trough) is located in the Pack Trail Allotment in Trail Canyon. Two reservoirs are located west of Little Park Wash in Little Park Allotment. There is a trough at Nutters Hole on the Showerbath Springs Allotment.

There are six segments of fence in the WSA. Two are old, short-gap fences across Rattlesnake Canyon. There are similar gap fences in Flat Canyon and along the Green River between Sand

Table 14
Livestock Grazing Use Data

Allotment	Size (Acres)	Active Preference (AUMs)	Kind of Livestock	Season of Use	Number of Operators
West of the Green River					
Big Horn	22,680	650	Sheep	11/01 to 04/30	1
Buckskin	7,132	156	Cattle	06/16 to 09/30	1
Elliot Mountain	43,000	725	Sheep	12/01 to 05/10	1
Green River	166,621	8,584	Cattle	01/01 to 12/31	1
Last Chance	22,110	400	Sheep	11/01 to 04/30	1
Little Park	23,393	242	Cattle, Horses	05/25 to 10/10	4
Price River	3,718	40	Cattle	04/15 to 05/14	1
Range Creek	54,888	300	Cattle	05/16 to 11/15	1
Range Mountain	3,433	120	Cattle	06/16 to 11/15	1
River	13,325	600	Cattle	12/01 to 04/10	1
Rock Creek	85,405	1,594	Cattle, Horses ¹	03/01 to 10/31	1
Pack Trail	14,000	653	Sheep	11/15 to 05/15	1
East of the Green River					
Rattlesnake	53,645	3,951	Sheep, Cattle	11/01 to 03/31	1
Showerbath Springs	47,090	601	Cattle	06/01 to 10/15	1
Tusher Wash	15,360	944	Cattle	11/12 to 04/30	1

Sources: USDI, BLM, 1972 and 1981b.

¹Horse use does not generally occur in the WSA.

DESOLATION CANYON WSA

TABLE 15
Allotment Acres and AUMs Within the WSA

Allotment	Acres in WSA		AUMs in WSA	
	Acres	Percent of Total Allotment	AUMs	Percent of Total Allotment
West of the Green River				
Big Horn	8,000	35	227	35
Buckskin	670	9	107	69
Elliot Mountain	43,000	54	729	50
Green River	26,000	16	600	7
Last Chance	12,000	54	239	60
Little Park	7,700	34	179	74
Price River	3,700	100	40	100
Range Creek	20,000	37	55	18
Range Mountain	400	12	111	92
River	11,110	85	560	93
Rock Creek	60,000	71	877	55
Pack Trail	14,000	100	653	100
East of the Green River				
Rattlesnake	42,750	95	3,763	95
Showerbath Springs	34,140	72	443	72
Tusher Wash	6,180	40	380	40
Total			8,963	

Source: USDI, BLM, 1972 and 1981b.

Knolls and Short Canyons and at Rock Creek. With the Rock Creek gap fence is a 0.25-mile stretch post and pole enclosure near the historical Rock Creek Ranch.

Of these developments, only the reservoirs in Little Park require and currently receive maintenance by mechanical equipment. With the exception of use of ways in Little Park and upper Range Creek, all livestock activities are conducted on horseback.

There are a few proposed projects by livestock operators. One rancher has grazing privileges in the River, Pack Trail, Big Horn, and Elliot Mountain Allotments. Water distribution is poor on these allotments and there is a need to develop water to improve grazing distribution. The operator has been allowed to use the Beckwith Plateau road for grazing access and pond construction on State sections. Last Chance River, Big Horn, and Elliot Mountain Allotments were in nonuse status from at least 1975 through 1984. The allotments are, in large part, not well suited to intensive investments for grazing management. The probability of major range projects occurring in these allotments is low. Some small reservoir or spring development may be needed to keep livestock from utilizing only the river and stream bottoms. Another rancher has applied for reconstruction of the existing diversion dam on Rock Creek near

the historical ranch, using existing irrigation ditches.

Potential vegetation manipulation projects identified in the WSA include a 1,270-acre chaining-and-seeding project on Green River Allotment for a projected increase of 127 AUMs and a 350-acre chaining project on Little Park Allotment for a projected increase of 68 AUMs. These land treatments would result in a total increase of 195 AUMs.

The Range Creek wild horse herd of approximately 25 horses is located on Cedar Ridge in the WSA. The WSA includes 6,850 acres or 19 percent of the total herd range.

Visual Resources

About 90 percent (260,700 acres) of the WSA is rated as Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water in most of the canyons, and rich and pleasing color combinations. Areas from Little Park to the clifflines north of the Price River and on Cedar Ridge were identified as Class B scenery primarily due to lesser amounts of vertical relief.

All Class B scenery areas (28,950 acres) are in the foreground view from the Little Park/Turtle Canyon road or the Owlhoot Trail through Trail Canyon except for the southern Little Park Wash vicinity and top of the point between the confluence of the Green and Price Rivers. South Little Park Wash and Cedar Ridge are rated as seldom seen while the benches on either side of Little Park Wash are in the background to most viewers. The point above the confluence of the two rivers is in the background to most viewers.

The VRM class adopted for 87 percent of the WSA (252,490 acres) is Class II. Another 22,000 acres are in VRM Class I, a special designation covering Desolation Canyon National Historic Landmark. About 2,560 acres along Little Park Wash and 6,600 acres along Cedar Ridge are VRM Class IV, while about 6,000 acres on either side of the Little Park Wash and on the point between the two rivers are Class III.

Two localized Class V areas identified as visual intrusions are a severe fire scar on Range Valley Mountain at the head of Lighthouse Canyon and an abandoned drill site on the Beckwith Plateau (refer to Appendix 7 for an explanation of BLM's VRM rating system).

The geology, topography, vegetation, and water characteristics of the WSA discussed above combine to create dramatic landscapes, formidable in

DESOLATION CANYON WSA

scale and rich in variety, contrast, form, and color. Ridges and canyon walls from 1,000 to 5,000 feet, spires, pinnacles, balanced rocks, arches, fins, overhangs, buttresses, dense stands of Douglas fir and junipers clinging to rock, sheared weathering surfaces on rock, and creeks and rivers all are landscape elements of the WSA. A diversity of landscapes is present between the high mountain, forested slopes along the Tavaputs Plateau and the cottonwoods and greasewoods on the alkali flats, dunes, and beaches along the rivers.

Cultural Resources

There are two special designation areas, Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District, within the WSA.

An estimated 22,000 acres of the Desolation Canyon National Historical Landmark (36 percent of the total landmark acreage) are in the WSA, covering an area extending 1 mile west of the Green River from the WSA's northern boundary south to Rain Canyon. The National Landmark designation was approved by the Secretary of the Interior in November 1968, and was dedicated in June 1969. The landmark is based on natural values and environs present when Major John Wesley Powell explored the canyon in 1869. Desolation and Gray Canyons and many of the features along the river, including side canyons, were named by the Powell expeditions of 1869 and 1871.

The Flat Canyon Archaeological District was established in 1975 based on known high quality examples of the San Rafael Fremont rock art and structures and the strong likelihood of evidence related to permanent occupation. The significance of a site that could yield important data on Fremont peoples is in part a result of a lack of known, high quality sites that have not been disturbed. Additional sites of this type may occur within the WSA.

Of the 55 sites recorded within the WSA, 23 are rock art sites, 15 are rock shelters of which at least nine have structural remains, 14 sites are open, unprotected sites such as lithic scatters, one site is a burial, and two sites are historical structures. All but the historical sites are Fremont, although possible Ute figures may appear on one Fremont rock art site. Few habitation sites are known to occur within the WSA. Based on present limited information, 100 or fewer of the seminomadic Fremont people were residing in Desolation and Gray Canyons at any one time hunting, farming the canyon bottoms, and collecting pine nuts or

harvesting Indian ricegrass. Their travels were probably limited to the Tavaputs Plateau and surrounding canyon bottoms.

Non-BLM documentation has also identified a number of rock art sites for Fremont peoples around the Tavaputs Plateau. Of these, 23 sites are in or immediately adjacent to the WSA. Some of these duplicate BLM recorded sites; others do not. A number of additional sites, mainly rock art, are known but not recorded. The composition and number of known sites indicate a probability of a large number of undiscovered sites.

The Gunnison crossing of the Old Spanish Trail in the mid-19th Century is located just south of the WSA. Gunnison Butte and Beckwith Plateau are named for members of a survey party searching for a transcontinental railroad route through the area.

Several of the trails in the WSA were commonly used by the Wild Bunch of western outlaw history. Trails through Trail Canyon, along the Price River, in Rattlesnake Canyon, along the Green River, over the Golden Stairs, and in Range Creek are among these. Activities of the Wild Bunch and their encounters with local lawmen and ranchers within the WSA are records of western history. Other than the trails, some of which may have been established by the Wild Bunch, and possibly some historical structures in Range Creek on private land, no physical historical outlaw evidence has been located. Many tributary canyons in Gray Canyon are named for the Wild Bunch, among them Dilly, Curry, Joe Hatch, and Flat Nose George Canyons.

At least five historical structures are reportedly in the WSA, including a labor camp site of rock houses associated with the abandoned Coal Creek dam project and a rock house near the Green River. Recent information indicates other historical structures at the head of Short Canyon on the Beckwith Plateau, in Rattlesnake Canyon, and in Rabbit Valley that have not been documented. Historical structures on private or Indian land adjacent to the WSA are found near the ranch and lodge in Range Creek, at Rock Creek, at Florence Creek, and on the Tavaputs Plateau. All are known or thought to have been built by early pioneers and ranchers in the area.

Recreation

Portions of three stream segments identified in the Nationwide Rivers Inventory as potential candidates for the Wild and Scenic Rivers System are within the WSA. Portions of the Green and Price Rivers and Range Creek were identified.

DESOLATION CANYON WSA

The most highly used access points to the WSA are the Sand Wash road and airstrip and 8 miles of county road along the east side of the Green River ("cherry-stemmed" road in the southern portion of the WSA) and Turtle Canyon road (also a boundary). Sand Wash, 7 miles northeast of the WSA, is the most used access. From Sand Wash the WSA is accessed by 16 miles of river. Some recreationists also reach the WSA boundary by public access along Horse Bench, from Woodside to the Book Cliffs, in Tusher Canyon, and through Sego Canyon. Access to the WSA also exists in Range Creek, on Range Valley Mountain, and at times in Chandler Canyon, providing permission of private land owners or the Ute Indian Tribe is obtained. The road in Chandler Canyon has not been useable since 1983.

There are 11 segments of developed trail totaling about 144 miles. In addition, the Beckwith Plateau "cherry-stemmed" road connects three segments of trail. The trails include Flat Canyon, Van Duesen (Rock Creek), Trail Canyon (north-upper segment is no longer passable except on foot), Last Chance, Trail Canyon, Owlhoot along the Price River, Golden Stairs, Long Canyon (south Beckwith), Short Canyon, Rattlesnake Canyon, and the Green River trails. Innumerable off-trail routes are possible, and some are commonly used to the point where foot trails have become well established. Wash and creek bottoms are also commonly used. A substantial number of potential routes in steeper canyons, across ridges between canyons, in very densely vegetated bottoms, and in canyons requiring short rock ascents or traverses are also present that are now receiving little or no use.

Sand Wash Ranger Station (north of the WSA) is the major BLM facility related to recreation use for the WSA. The site is used for camping, launching boats, sightseeing, fishing, and picnicking. Other BLM facilities associated with recreation use of the WSA include a toilet at Swasey Rapid and ramp sites, fire pits, and a small ramp and visitor register at Nefertiti Rapid.

There are about 50 riparian bottoms within the WSA along the Green River commonly used for camping. These sites are all primitive with no facilities. About 175 to 400 people camp in the canyons at these sites at any one time during the floatboating season. The most common drinking water supply points along the river are at Rock Creek and Range Creek. Visitor use on the Green River is controlled by permitting and scheduling launches.

There are four privately owned lodges adjacent to the WSA, two on the Tavaputs Plateau and two in

Range Creek. Present combined capacity of the lodges is about 85 guests. A ranch south of the WSA offers outdoor sports activities and the operator has applied to conduct some of these activities, including horseback outfitting, in the WSA. A private boat ramp and vehicle shuttle service are also located south of the WSA. One of the more heavily used services in the community of Green River connected with the use of the WSA is an air shuttle service to Sand Wash. There is also a boat rental business in Green River renting primarily to groups using the river in the WSA. Other services provided are vehicle shuttles by individuals, motel accommodations, developed camping, restaurant services, etc.

Green River State Park is located in the Town of Green River south of the WSA. It is a large camping and picnicking facility with a boat ramp, sometimes used as a takeout, particularly for large boats, after trips through the WSA.

Presently there are 26 outfitting businesses primarily involved with river excursions offering services in the WSA. Several outfitters have begun offering trips combined with horseback riding and stays at the lodges on the Tavaputs Plateau. River trips range from 3 to 10 days with some trips offering extended hikes. Some also offer training in boating skills and seminars or trips tailored to special groups.

The Green River through Desolation and Gray Canyons (in the WSA) is covered by nearly all whitewater guidebooks addressing major rivers in Utah and the West. A number of map and interpretive guides that apply to the WSA are available, including journals of members of the Powell expeditions, covering rapids, geology, history, archaeology, natural features, and sites of interest.

The recreational use of the WSA is currently estimated at 68,000 visitor days annually. Of this amount, 60,000 visitor days are attributed to water-based recreation controlled by BLM's permit system in Desolation and Gray Canyons on the Green River (30,000 visitor days for commercial use and 30,000 visitor days for noncommercial use). The remaining 8,000 visitor days are attributed to 3,000 visitor days of noncommercial land-based activities such as hunting and horseback recreation and 5,000 visitor days of float boating on the Price and Green Rivers that is not controlled by BLM's permit system. There is no use solely for ORV play activities.

Floatboating in the WSA is the primary recreational activity for the WSA. The portion of the Green River in the WSA contains about 60 rapids

DESOLATION CANYON WSA

of varying degrees of difficulty. The difficulty of rapids also varies considerably with water levels. The rapids are rated Class III to IV, with Class V being the most difficult on the International Scale of Whitewater Difficulty.

Inflatable boats, ranging in size from 10-foot rafts to large 23-foot-long pontoon boats, are the most commonly used craft. A diversity of other water craft is also used including kayaks, sport yaks, whitewater canoes, and dories. Motors are sometimes used.

The Desolation and Gray Canyon sections of the Green River River Management Plan were completed and approved in 1979. The plan focuses primarily on recreation. Management objectives are to:

1. Maintain the natural character of the canyon environment in Desolation and Gray Canyons.
2. Provide for the equitable distribution of available user days to a broad spectrum of the public.
3. Provide a continuing opportunity for a quality wilderness-type experience between Sand Wash and Nefertiti Rapid.
4. Provide an opportunity for day-oriented recreation below Nefertiti Rapid.
5. Protect the scientific value of cultural resources while allowing for their enjoyment.
6. Provide for safe and lawful use of the river resource.

To accomplish these objectives, specific management actions are identified for the canyons and include the following actions relevant to the wilderness study:

1. Establish a carrying capacity of 64,000 visitor days.
2. Suspend oil and gas exploration within the management plan corridor to provide interim protection to wilderness-type values, endangered species' critical habitat, and cultural resources.
3. Continue to recommend legislation identifying the Green River in Desolation and Gray Canyons as a Study River under the Wild and Scenic Rivers Act.
4. Limit motorized travel to downriver low speed wakeless use (use such as now occurs).
5. Acquire title or scenic easements to protect scenic and river recreation values.

6. Reduce maximum party size from 40 to 25 to conform to preferences expressed by users and to mitigate concern about crowding on the river.

7. Construct livestock barriers (at five campsites within the WSA) as necessary to protect wilderness and recreation values. Only one of these barriers, at Rock Creek, has been needed or constructed. The purpose of the barrier was water quality and fishery protection. Rock Creek is the most heavily used canyon for dayhiking and potable water resupply.

8. Close Rock Creek to overnight camping to allow for day use received.

9. Restrict use of the Range Creek jeep trail 1.25 miles upstream from the Green River if litter, garbage, fire pits, human waste, and archaeological vandalism cannot be controlled.

A permit system is used by the BLM for monitoring use by both commercial and private river use from about April through mid-October. Of Green River users interviewed in 1978, 82 percent perceived they were in a wilderness. Fifty-four percent of the use comes from cities over 250,000 in population. Thirty-six percent of the use is sponsored by formal organizations such as school, church, and youth groups. Use comes from the Wasatch Front (25 percent), Denver Metropolitan Area (20 percent), California (17 percent), and other localities, states, and countries. Due to the length of the trip, most users spend 1 to 6 months planning their trips, often to coincide with vacations from work (Schreyer and Nielson, 1978).

Floatboating on the Price River is currently limited, amounting to about 100 users per year. High quality floating is available during high spring/early summer flows for about a 3- to 6-week period. The 12 to 15 major rapids can be difficult, technical, and rocky. The river is suitable for small rafts, kayaks, and canoes.

Fishing use of the Green River is made by a small percentage of floatboaters and residents of the towns of Green River and East Carbon. Fishing is for catfish, carp, and suckers. The river has a large fish population and propagation is good.

Rock Creek and Range Creek are trout fisheries within the WSA. Rock Creek contains brown, rainbow, and strains of cutthroat trout. Present fishing use is light. Short segments of Range Creek with good to fair fishing opportunities for rainbow trout occur within the WSA, although access is limited by adjacent private lands. Fishing

DESOLATION CANYON WSA

use in Rock Creek is by floatboaters and in Range Creek is primarily by guests at the lodges.

Deer hunting opportunities in the WSA are good; however, rugged terrain and sometimes weather are major limiting factors. About 200 to 250 hunters use the WSA. Areas of concentrated hunting use are Little Park, Turtle Canyon, and Range Creek. Use in other portions of the WSA is low due to low deer numbers, terrain, or access. Presently, elk populations are not sufficient for hunting west of the Green River.

Use figures for chukar hunting are not available. High quality opportunities are available in the canyon bottoms from Range Creek south in the WSA. Populations of chukar partridge, particularly along the Price and Green Rivers, are good to excellent. Significant amounts of use occur in these areas now.

The WSA is closed to ORV use except on existing roads and trails. However, use is very limited since most of the WSA's topography is not favorable for ORV activities. Some use of the jeep trail along Range Creek occurs, although it is mainly for access to the river rather than for vehicle recreation. The trail is confined to the gravel terraces in the canyon bottom crossing the creek 27 times and is not always passable. In Little Park Wash, the terrain features are more favorable for ORV use and some use now occurs. Throughout the entire WSA, ORV use is now estimated at fewer than 200 visits. The 5.5 miles of ways in the WSA are also infrequently used.

The WSA is well suited for hobby activities such as photography, bird watching, and plant identification. These generally occur in conjunction with other recreation activities. Rockhounding is limited by the lack of known gem quality stones. Some sightseeing at a fossil site just north of Peters Point in the Wasatch Formation is known to occur.

Beckwith Plateau has been identified as a potential National Natural Landmark by the NPS (May 1983). The identified area is 37,760 acres, of which about 35,000 acres are within the WSA. Significant features of the potential natural landmark identified are (1) its isolation as a topographic feature separated by two rivers and vertical cliffs of about 1,000 feet; (2) the exposed formations at the locations record the eastward crowding of the Mancos seaway; (3) the presence of visible coal seams at the surface; (4) excellent expression of erosional features of the Book Cliffs, such as castellate and buttressed upper slopes and complex badlands; and (5) botanical features. The principal reason cited for potential

designation was use as an interpretive model of processes leading to formation of coal in a classic regressive coastal sequence.

Wilderness Values

SIZE

The Desolation Canyon WSA's size (289,650 acres) is sufficient to enhance wilderness values present. Its configuration is irregular, but approximates an L-shape. The WSA is about 50 miles long, north to south, and ranges in width from 1 to 28 miles, east to west.

NATURALNESS

The WSA has a substantial number of important natural features. Elevation varies by more than 5,500 feet and types of vegetation and wildlife habitat vary. In the north portion of the WSA, water is relatively abundant, especially for an area in the arid southwest. The extreme ruggedness of the terrain contributes to the WSA's scenic quality, remoteness, and habitat for species such as raptors and bighorn sheep which are sensitive to development. The WSA contains both canyon desert and high mountain environments.

About 2 miles of road and a gas drill location have been constructed in the WSA on a pre-FLPMA lease in Jack Creek since the intensive inventory (refer to the Mineral and Energy Resources, Oil and Gas section). Production has been attained at the location and the road is likely to remain for 20 to 30 years. About 1.5 miles of road also extends to a drill site along Cedar Ridge to the south of Jack Creek (now "cherry-stemmed" from the WSA). About 3.0 miles of abandoned road extends out of a southern fork of Cedar Ridge to an abandoned drill site. This also is "cherry-stemmed" from the WSA. Some revegetation has occurred and it is not believed to receive any use at this time. Another 5-mile-long way in Little Park is maintained sufficiently to permit maintenance of livestock ponds as needed. A 1-mile section of mechanically constructed trail (not passable to a vehicle) runs between Range Creek and the Last Chance Benches. About 4 miles of two partially revegetated seismograph trails/ways extend out on the points between the Green and Price Rivers and remain in the WSA. Pieces of an abandoned road extending about 6 miles along the west side of the Green River between Gunnison Butte and the Price River are still visible, although much of this imprint has either revegetated or been covered by landslides. Spring developments and gap fences are addressed under the Livestock section.

Of all these imprints, when considering the area affected, the present state of the imprint, and the surrounding topography and vegetation, the road in Jack Creek is the only one that is noticeable. It will continue to receive regular maintenance and its presence cannot be avoided by a visitor in the canyon bottom.

The “cherry-stemmed” road along the Price River and onto the Beckwith Plateau presents an imprint to naturalness. The WSA excludes the imprint by “cherry-stemming” but its significance in the WSA, as a whole, is less certain. Public input specifically addressing this imprint expressed that it was not considered substantially noticeable when considered in the context of the area surrounding it. It was mechanically constructed and maintained in 1974 and 1975 and has segments of cut and fill and/or removed tree cover. It is about 18 miles long and ends in a drill site that was identified as a significant imprint by visual resources and wilderness inventory.

In the head of Naylor and Bobby Canyons, segments of a way constructed in the 1950s to access mining prospects remain. All are inaccessible and for the most part are only visible for short distances. Four prospects are located along the way. These affect a small area and also are not substantially noticeable. Other intrusions including two livestock reservoirs, five spring developments, and five historic structures are also not considered substantially noticeable.

Overall, imprints affect about 1 to 2 percent of the WSA; however, essentially all 289,650 acres meet the naturalness criterion for areas under wilderness review.

SOLITUDE

The size and configuration of the WSA enhance opportunities for solitude. The WSA’s topography also contributes to outstanding opportunities for solitude. Canyons ranging from 1,000 to 5,000 feet deep are separated by narrow ridges in the north and benches or plateaus in the south. There are about 400 to 450 miles of canyon bottom within the WSA. Lines of sight along the bottoms rarely exceed 0.5 mile and are usually considerably less. Canyons in the north half of the WSA generally become more V-shaped from east to west. Canyons along the river and in the south of the WSA nearly all alternate near vertical walls with steep talus slopes. Topography, by itself, in most of the WSA offers outstanding opportunities for solitude.

In about 65 percent of the WSA, vegetation complements topography in augmenting these

opportunities, based on significant cover by tree or large shrub species. The remaining 35 percent is dominated by rock outcrop and smaller brush types that do include some large tree or brush species but cover is considerably less.

One offsite influence that affects opportunities for solitude is the presence of the Uintah and Ouray Indian Reservation along the Green River. This land is rugged and scenic and has topographic and vegetation features similar to those on the opposite side of the river. It is undeveloped with the exception of a rarely used dirt road between Chandler Canyon and Florence Creek that has been impassable since 1983.

The most significant offsite influence results from the presence of the Town of Green River near the WSA on the south and use of 7 miles of county road east of the Green River, “cherry-stemmed” from the WSA. The road receives regular vehicle use, and recreational use is a combination of day use, floatboating, and park use by residents of Green River. Elsewhere the WSA is separated from the town by 1,000-foot cliffs. The roads in Jack Creek and on Cedar Ridge affect opportunities for solitude as they are regularly used to check the existing well locations. Interstate 70 (I-70) and Utah Highway 6/50 are visible from points along the Book Cliffs at distances of 2 to 5 miles. Vertical separation is about 1,000 feet and influence on solitude is not significant.

Vistas within the WSA along the Book Cliffs, along ridge tops, and along the high benches south of the Roan Cliffs offer extensive overlooks of the terrain and impressive vertical relief within the WSA. Views can also be obtained of mountain ranges to the north, south, and west 50 to 100 miles away.

Offsite grazing, agricultural, and guest lodge uses on the Tavaputs Plateau and in Range Creek are not inconsistent with, but in many respects complement, wilderness use.

In summary, about 90 percent (260,700 acres) of the WSA meets the criterion for solitude due to very rugged terrain. Another 9 percent of the WSA (26,050 acres), in the areas where topographic screening is not dominant, also meet the criterion due to vegetative cover. In the remaining 1 percent (2,900 acres) in the drainages of Jack Creek, on Cedar Ridge, and along the east side of the Green River along the existing roads, opportunities for solitude are less than outstanding.

PRIMITIVE AND UNCONFINED RECREATION

Recreational opportunities are discussed in detail above (refer to Recreation section). The entire

DESOLATION CANYON WSA

WSA is very well suited for a diversity of outstanding primitive recreation. Present use is primarily whitewater river running, and the camping, hiking, fishing, swimming, and sightseeing activities associated with it. Based on these opportunities the WSA meets the outstanding primitive recreation criterion for areas under wilderness review. Outstanding opportunities and uses likely to expand in the near future include horseback activities and more extensive hiking, including backpacking or dayhikes from lodges or access points around the WSA. Hunting uses would be expected to continue, and some increased use for mountaineering or winter sports may occur.

SPECIAL FEATURES

Among the most unique features of Desolation Canyon are its physical dimensions. It is over 1 mile deep at Rock Creek and has an extensive system of canyons with multiple forks. Special features include the large size of the WSA, arches, pinnacles, and other erosional remnants not known to occur elsewhere in the Wasatch Formation in similar concentrations or settings. Vegetation is diverse, ranging from desert to high mountain types, in many places in a distance of only 5 or 10 miles. Water is also fairly abundant in the north half of the WSA. The diversity of wildlife in the WSA is unusual compared with public lands surrounding the WSA, including bighorn sheep and elk, mountain lion and bear, a large diversity of birds, trout, catfish, and three Federally endangered fish species. Abundant raptor habitat is present, and sightings of the endangered peregrine falcon and bald eagle have occurred. The scenic quality and wilderness setting of the WSA are features that are directly related to its recreation use and value. The WSA includes both Flat Canyon Archaeological District and a portion of Desolation Canyon National Historical Landmark.

Land Use Plans and Controls

Lands within and adjacent to most of the WSA are primarily Federally owned, managed by the BLM. Large blocks of non-Federal land adjacent to the WSA include the Uintah and Ouray Indian Reservation, private land along the top of the Tavaputs Plateau, and a string of private parcels in Range Creek. There are 41 State sections in-held in the WSA for a total of 24,845.7 acres. The management philosophy for State sections is to maximize economic returns for the State School Fund. Split estate lands in-held within the WSA total 1,072.83 acres.

Rights-of-way adjacent to the WSA form boundaries in Turtle Canyon and on the Big Horn

Benches. One right-of-way exists in the WSA in Jack Creek for the purpose of gas production. There are no other rights-of-way or pending applications for rights-of-way in the WSA.

The surface is Federally owned; the minerals except for coal are not.

Carbon County (Carbon County Commission, 1981) has zoned the area within the WSA as Critical Environmental 1 (CE-1). Land use objectives for the CE-1 zone are: (1) to protect and conserve the water supply, vegetation, soils, wildlife, and other natural resources within the watershed; (2) to avoid the creation of hazard from floods, fire, and other dangers; (3) to preserve the aesthetic appearance of the landscape; and (4) to prevent the degradation of the environment and waste of natural and financial resources.

Permitted use under CE-1 includes grazing and pond construction. Major construction requires review and approval by the county.

Emery County (Emery County Board of Commissioners, 1984) has zoned the WSA for mining and grazing. Land use objectives are: (1) to promote the conservation of water, land, mineral, and other resources; (2) to prevent the degradation of the natural and social environment; (3) to foster agriculture, mining, and industry within the State; and (4) to provide a location for certain types of agricultural, industrial, and other uses that, because of certain characteristics of operation such as odor, noise, etc., are not compatible with urban development. Permitted uses include grazing, pond construction, minor mines and utility projects, and buildings. Major construction, mining, etc. requires county review and approval.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) identified no specific management plan or zoning for the WSA; however, the plan does not favor wilderness designation in the county and generally emphasizes continuation of present uses and maximizing mineral development. The Grand County Commission also does not favor wilderness designation in Grand County.

Public lands in the WSA are managed under the BLM land use plans. The Price River MFP (USDI, BLM, 1982c) identifies specific management proposed for the WSA including (1) river recreation management as identified in the Desolation and Gray Canyons of the Green River River Management Plan (refer to Recreation discussion); (2) oil and gas development of Peters Point Field; (3) two potential vegetation manipulations; (4) management for water and fishery quality in Rock

Creek under the Rock Creek Habitat Management Plan; (5) protection of watershed, wildlife, cultural, and visual resources; (6) establishment of oil and gas leasing categories; and (7) maintenance of existing grazing management and practices. The Grand Resource Area RMP (USDI, BLM, 1983) identifies: (1) establishment of oil and gas leasing categories; (2) maintenance of existing grazing management (no intensive management projects such as chainings, etc.); and (3) protection of watershed, wildlife, cultural, and visual resources. The Grand RMP has been reviewed by the Governor of Utah and is consistent with State plans.

Socioeconomics

DEMOGRAPHICS

Carbon County can be summarized as rural with an urban area around the City of Price. Emery County can be summarized as rural with a string of small communities in Castle Valley. Carbon and Emery Counties had 1982 populations of 24,600 and 12,900, respectively. Communities closest to the WSA include: Price, Wellington, East Carbon, Sunnyside, and Green River. The City of Price (1980 population of 9,086) is located in Carbon County, 30 miles west of the WSA, and serves both Carbon and Emery Counties as a major service center (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The adjacent communities of East Carbon and Sunnyside (total 1980 population of 2,553) are located in eastern Carbon County, 8 miles west of the WSA, and provide land access to the western part of the WSA. Green River (population of 1,048), located on the county line between Emery and Grand Counties, 6 miles south of the WSA, provides downstream river egress from the WSA. A road leading north from the Town of Green River also provides access to southern portions of the WSA along the river.

Carbon and Emery Counties comprise 5,916 square miles or 3,781,952 acres. About 73 percent of the counties is managed by the Federal Government, 10 percent by the State, and 17 percent is privately owned.

Grand County is rural and sparsely populated. The 1982 county population was 8,100, less than 1 percent of the State population of about 1.5 million (USDC, Bureau of the Census, 1981). The majority of the county is unpopulated with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab, and 32 percent lives in Spanish Valley which is adjacent to and southeast of Moab (USDC, Bureau of the Census, 1981).

Grand County is fairly large, comprising about 4.5 percent of the State, or about 3,615 square miles. About 80 percent of the county is owned by the Federal government, 15.5 percent by the State, and 4.5 percent by private landowners.

EMPLOYMENT

Growth in the affected area, particularly Carbon County, is linked with the coal industry. The region's population increased 62 percent between 1970 and 1980, and Emery County has the highest rate of growth in Utah for the largest share of income earned in the region (USDC, Bureau of the Census, 1981). Between 1981 and 1983 employment in the local coal industry has decreased 15 percent (USDC, Bureau of the Census, 1981; Utah Department of Employment Security, 1983). Despite the recent slump, the coal industry remains the area's largest employer. Construction and operation of electrical generating plants also provide a large share of employment in the area. The local income and employment attributable to these powerplants are reflected in the construction, public utility, and mining sectors. A number of other businesses depend on the mines and powerplants to purchase their products, and many retail and service businesses depend on the worker's local expenditures. A profile of wages, salaries, and employment for Carbon and Emery Counties is shown in Table 16.

Recent statistics show that 99 percent of Grand County's wage and salary employment is non-farm, with about 17 percent employed by Federal, State, and local governments (refer to Table 17). Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent mining and milling layoffs may reduce local mining importance. Tourism directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money for export industries contributes to local income and employment. Including these multiplier effects, mining and tourism accounts for 35-45 percent and 17-25 percent of local employment, respectively. Unemployment in the county is among the highest in the State with 1983 first quarter figures of almost 18 percent (Utah Department of Employment Security, 1983). This is primarily due to large mine layoffs and the resulting downturn through the local economy.

INCOME AND REVENUES

Past activities in the WSA that could be of any local economic consequence include mineral

DESOLATION CANYON WSA

activities, livestock production, hunting, and recreation. Table 18 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

Gas production from the Greater Jack Canyon KGS and exploration of the WSA for oil and gas has brought some income and employment to residents of the area. The WSA also has 34 mining claims that appear current in assessment work. Regulations require a \$100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Eighteen livestock operators in 15 allotments have grazing privileges in the WSA. Based on the consumption of 8,963 AUMs of forage by cattle, it is estimated that the WSA accounts for \$179,260 of livestock sales, including \$44,815 of ranchers'

returns of labor and investment. These expenditures would be significant to local ranchers; however, they are of low significance to the local and regional economies.

Due to terrain, hunting pressure is low in most areas. Related expenditures would only be significant to the lodges and commercial outfitters using the WSA.

The WSA supports significant private and commercial boating use. Commercial boating use directly accounts for an estimated \$1.15 million in sales by the 26 operators using the WSA. Eleven outfitters are located outside the affected area, and their operations contribute less to the local economy than do the 15 local outfitters. Including multiplier effects, the purchases of local outfitter services, the local purchases by nonlocal outfitters, and the local expenditures by private users account for \$460,000 of earned income and 40 jobs in Carbon, Emery, and Grand Counties.

Table 16
1981 Personal Income and Employment
Carbon and Emery Counties, Utah

Industrial Sector	Carbon County		Emery County	
	Income (Percent)	Employment (Percent)	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1	Less than 1	Less than 1
Total Agriculture	Less than 1	Less than 1	Less than 1	Less than 1
Mining	45	27	48	39
Construction	6	5	23	17
Manufacturing	2	3	Less than 1	Less than 1
Transportation and Public Utilities	11	8	15	13
Wholesale Trade	5	5	1	1
Retail Trade	8	15	2	6
Finance, Insurance and Real Estate	2	3	1	1
Services	9	15	2	6
Other	-	-	-	-
Total Private Industry	88	79	93	85
Federal Government	2	4	1	3
State and Local Government	10	17	6	12
Total Government	12	20	7	15
Total Nonagricultural	100	99	100	100
Unemployment (1st Quarter, 1983)	16.9			9.3
	(Dollars)	(Jobs)	(Dollars)	(Jobs)
Total Employment and Earnings	\$172,517,000	9,914	\$128,985,000	6,165
Total Personal Income	\$229,540,000		\$97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983, Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include wage, salary, and proprietors' income. Employment percentage figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

DESOLATION CANYON WSA

Economic effects are concentrated in (1) certain communities such as Green River, which has an employment work force of 238; and (2) certain industrial sectors such as retail and service businesses. Therefore, expenditures related to boating use of the WSA are significant to a number of local businesses.

TABLE 17
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agriculture	1	1
Mining	34	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10	8
Retail Trade	10	18
Finance, Insurance and Real Estate	3	2
Services	11	16
Other	-	-
Total Private Industry	85	82
Federal Government	5	6
State and Local Government	9	10
Total Government	14	16
Total Nonagricultural	99	99
	(Dollars)	(Jobs)
Total Employment and Earnings	\$52,753	3,617
Total Personal Income	\$ 75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include wage, salary, and proprietors' income. Employment percentage figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

TABLE 18
Local Sales And Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	Unknown	Up to \$618,600 lease fees, up to \$27,140 royalties
Mineral Production	\$3,400	None
Livestock Grazing	\$179,260	\$12,548
Woodland Products	None	None
Recreational Use	Less than \$1,152,000	\$58,000
Total	Less than \$1,334,660	Up to \$716,288

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total income that would be generated by these expenditures.

Land-based recreation use of the WSA is low. Except for the four lodges near the WSA, the related local expenditures are well distributed and locally insignificant. Use of these lodges, some of which is associated with use inside the WSA, accounts for an estimated \$175,000 of sales. There has also been an expressed interest in beginning a number of new commercial horse-back trips through the area. The WSA does support some land-based motorized use; however, use is low and related expenditures are insignificant locally and to any business.

The WSA generates revenues to the Federal Treasury from three sources: mineral leasing, grazing fees, and recreation use permits. Within the WSA, about 206,200 acres are currently leased for oil and gas. At \$3 per acre, this generates up to \$618,600 annually. Half of this, or about \$309,300, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 8,963 AUMs of forage consumed by livestock in the WSA and a 5-year grazing fee average of \$1.40, the WSA annually accounts for \$12,548 of grazing fee revenues to the Treasury. One-half of this is allocated back to the local BLM District for the construction of range improvement projects. Commercial and private water-based recreation use of the WSA generated about \$40,000 in fees in 1983. Based on changes to the national fee schedule, this would increase to \$58,000 annually by 1986.

Natural gas production of 78,953 cubic feet has been produced yearly from the Greater Jack Canyon KGS (Peters Point area) of the WSA since 1982. This production has generated an estimated 1.5 work years of employment over the past 3 years, much of which represents local employment.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for all Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.

DESOLATION CANYON WSA

3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable energy resources.
6. Once designated, management of the area would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas, other leasable minerals, and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but is expected to be moderate for oil and gas development and low for other leasable or locatable minerals due to the presence of more favorable deposits located elsewhere. The following analysis is based on the assumption that minerals within the WSA would be developed some time in the future and cause the following disturbance: oil and gas, 310 acres; tar sand, 700 acres; coal, 550 acres; and uranium, 20 acres. It is assumed that oil shale would not be developed. Surface disturbance resulting from vegetation treatments would total about 1,620 acres and about 2,000 acres could be inundated by a potential reservoir. Although the reservoir is unlikely, it is reflected in the analysis to measure

the full range of possible trade-offs. Because many of these activities would overlap, total disturbance would not be expected to exceed 2,500 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a Class II area under the PSD regulations. Disturbance of about 2,500 acres would result in moderate increases in fugitive dust emissions; however, Class I air quality areas would not be directly affected. The likelihood of this magnitude of disturbance is low because tar sand resources would probably not be developed. Oil, gas, and coal would more likely be developed, along with the potential vegetation treatments. Fugitive dust would be reduced as vegetation became reestablished on disturbed areas. Development of the Sunnyside STSA just west of the WSA could affect air quality throughout the WSA (USDI, BLM, 1984c).

GEOLOGY

Impacts to geology in the WSA could result from surface disturbances associated with oil and gas, oil shale, tar sand, and coal exploration and development activities on about 2,500 acres. In addition to surface disturbance, subsurface effects resulting from in-situ development of tar sand and underground mining of coal could also occur. An undetermined amount of subsidence could result in a settling of the surface and possibly surface fracturing. This amount of disturbance, however, is unlikely because tar sand resources would probably not be developed in the WSA due to the low potential of this area when compared with other areas where these resources would be more economical to develop. Oil and gas and perhaps coal would most likely be developed.

SOILS

It is estimated that about 2,500 acres of soil would be disturbed by mineral exploration and development and vegetation treatment activities. The average rate of soil loss at present is estimated at about 0.65 cubic yard/acre/year for undisturbed areas and 5.54 cubic yards/acre/year on disturbed areas. Soil loss on the 2,500 acres would increase from 1,625 cubic yards/year to 13,850 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 12,225 cubic yards (6 percent)

over current annual soil loss. If built, the potential reservoir would inundate about 2,000 acres and would act as a sediment trap to reduce sediment yield from the WSA downstream of the damsite.

VEGETATION

The anticipated 2,500 acres of disturbance due to energy and mineral exploration and development and vegetation treatments would affect composition of vegetation types within the WSA. The most obvious change would be the conversion of pinyon-juniper woodland to grassland resulting from 1,620 acres of vegetation treatments. Acreage disturbed by energy developments in woodland or forest types would also result in obvious changes with the removal of the dominant vegetation (i.e., trees). Vegetation changes in other types could also occur; however, this has not been quantified because the exact locations of potential disturbances are not known. The potential reservoir would inundate about 2,000 of the 12,300 acres of riparian vegetation in the WSA. With the exception of the reservoir site, disturbed areas would revert back to the original vegetation type unless they are disturbed again (e.g., retreating the vegetation treatment areas).

Five FWS candidate or threatened plant species are found within or near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and would consult with the FWS as required by BLM policy (refer to Appendix 4). BLM would request a biological opinion when appropriate and would take necessary measures to protect these plants. Because necessary measures would be taken, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. Presently, most erosion within the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development and vegetation treatments could impact 2,500 acres under this alternative, with a soil loss increase of approximately 12,225 cubic yards/year. Actual sediment yield increases could be expected to be lower if surface disturbance took place on the more stable soils or with successful reclamation or prevention measures.

Increases in erosion could also cause increased stream sediment loads and possible changes in

some chemical parameters from dissolution and leaching. Water quality in Flat, Rock, and Range Creeks could be affected by increased sediment loading and concentrations in dissolved minerals. Soil in much of the WSA easily erodes when disturbed and levels for metals, organics, and other quality parameters could exceed State and/or Federal standards in certain areas. Flat Creek and Rock Creek, which serve as sources for human consumption, could be affected. Trout fisheries in Rock, Bear, and Range Creeks could also be adversely affected by a reduction in spawning, rearing, and shelter habitat. The most likely resources to be developed in the WSA are oil and gas. Oil and gas leasing categories in the WSA have been established with protective stipulations specifically designed to protect sensitive water resources; therefore, the significance of the impacts to water resources could be reduced.

An undetermined, short-term increase in salinity could occur due to surface disturbances on Mancos-derived soils where the Price River enters the WSA and along the Green River at the south of the WSA. This increase is not expected to be significant due to the small amounts of Mancos-derived soils in the WSA.

The most significant potential effects on water resources would occur if a potential hydro-electrical dam and reservoir were constructed on the Green River at a damsite partly within or downstream from its confluence with the Price River. An impoundment created by the dam would dramatically alter the character of the stream, both within the area inundated and downstream. Within the impoundment area, the free-flowing river would be changed to flat water and sediment build-up would gradually occur. About 2,000 acres in the WSA could be covered with water as the river's silt load settled out, and existing uses in the river canyon would be eliminated. Downstream the river would be regulated (at least partially), which could tend to reduce spring peak flows and stabilize seasonal flow regimens. Water quality might be slightly improved due to less turbidity. Reservoir depths would be deep enough to change downstream water temperature.

The probability of reservoir construction is low in the foreseeable future due to management limitations in current BLM land use plans, current low interest in hydroelectric and mineral development in the WSA, and economic factors. Therefore, with this alternative, no substantial impacts to water resources are expected in the foreseeable future, but the long-term potential for impacts would remain.

As an alternative use of the water resource, the Green River could continue to be used for free-flowing values, as noted in the Wildlife and Recreation sections. This use could be further supported by Wild and Scenic River designation and would have little impact on existing water resource conditions.

The extent and quality of the ground water resource in the WSA is not known. However, the location of numerous springs and seeps in the WSA indicates abundant ground water presence. In-situ mining of oil shale or tar sand or underground mining of coal could disrupt ground water movement and lower ground water quality. Some of the springs could dry up or experience reduced flow. Development of the oil and gas resource and the vegetation treatments would likely not affect ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Implementation of this alternative would result in little impact on energy and mineral development.

Oil and Gas

Current oil and gas leasing and production would not be affected. Areas along the Jack Creek anticline and the Uncompahgre Uplift could be explored, and an additional 34,660 acres of the WSA would be available for leasing. The oil and gas leasing categories for the entire WSA would remain, with 600 acres open with standard stipulations (Category 1), 240,140 acres open with special stipulations (Category 2), 120 acres open with no surface occupancy (Category 3), and 48,790 acres of no leasing (Category 4). About 17,790 acres of existing leases are in Category 4 areas. If these leases are not held by production prior to expiration they would be phased out to meet Category 4 restrictions.

Based on the SAI (1982) estimation, potential for oil and gas within the WSA could be 10 to 60 million barrels of in-place oil and 60 to 300 billion cubic feet of in-place natural gas. Three to 15 million barrels of oil and 18 to 90 billion cubic feet of natural gas are considered recoverable. Exact quantities of oil or gas that may be produced are uncertain and could be affected by price, cost of exploration and/or development, areas available for exploration outside of the WSA, and actual resources encountered at drilling. The most likely production would occur in small pockets of gas along the Jack Creek anticline and the Uncompahgre Uplift. Topographic characteristics of the WSA may influence recovery potential due to effects on exploration locations, access, and cost.

The relative potential of the WSA when compared to surrounding areas remains uncertain, but a number of possibilities for additional exploration exist within the WSA.

Coal

The potential for future exploration and/or production of coal would remain. Mining methods would be underground with surface facilities located within the WSA. The WSA has high to moderate potential coal areas estimated to contain 105 to 140 million tons of in-place coal, of which 50 to 70 million tons would be recoverable. The high to moderate potential coal area underlies 2,900 acres of the known 8,000-acre coal area. Another 100,000 acres of the WSA are underlain by mainly thin-bedded, low-grade coal. Most of this is more than 3,000 feet below the surface and is not considered to be a recoverable resource.

Tar Sand

Tar sand has been identified in the WSA. Less than 10 million barrels of oil from the tar sand resource exist, with less than 3 million barrels estimated to be recoverable. No lease conversion applications are located in the WSA. A portion of one tract for competitive leasing is within the WSA, but no interest has been expressed in developing this tract. Future leases could be considered, although the potential appears low since more favorable resources are located elsewhere.

Oil Shale

Approximately 23.5 million barrels of oil from the oil shale resource within the WSA are in-place and about 127,800 acres in the WSA are under oil shale withdrawal. This withdrawal is scheduled for review and probable revocation. Presently no shale has been leased within the WSA, and the potential that the resource will be developed is remote because more favorable resources are located elsewhere.

Hydropower

Withdrawals for hydropower sites within the WSA are being reviewed and, in most cases, revoked by the Bureau of Reclamation. With the exception of one site, they are not expected to indicate high hydroelectric potential. One site is located downstream of the confluence of the Green and Price Rivers. Construction of this reservoir would partially inundate canyons of the WSA and the adjacent Uintah and Ouray Reservation north to the Roan Cliffs. The dam would be about 100 feet in height and could potentially produce about 25 megawatts of power. No current proposal or expressed interest in this site is known to exist.

DESOLATION CANYON WSA

Locatable Minerals

The 127,800 acres of the WSA under withdrawal for oil shale are also closed to mineral location by the withdrawal. The remaining 161,850 acres would remain open for mining claim location. The WSA contains 34 mining claims covering 260 acres along the Book Cliffs north of Green River. The WSA is estimated to contain less than 500 tons of uranium oxide; therefore, the potential for development is low.

Salable Minerals

Although sand, gravel, and rock are located in the WSA, the potential for development of these resources is low due to more favorable locations elsewhere.

WILDLIFE

Species sensitive to human presence or surface disturbance, such as black bear, mountain lion, bighorn sheep, and nesting raptors, would be adversely affected by surface-disturbing activities on about 2,500 acres. Up to 16,960 acres of black bear and mountain lion habitat could eventually be lost due to human encroachment. Species that are just becoming reestablished in the area, such as bighorn sheep and elk, would not benefit from the habitat protection afforded by wilderness designation and could also be adversely affected. However, bighorn sheep populations and range would probably continue to increase slowly, although range loss could occur. Carrying capacity for bighorn sheep could be reduced by as much as 117 animals.

Nesting raptor habitat within the WSA would be expected to be reduced to 11,640 acres. About 5,080 acres of potential nesting habitat for peregrine falcon (endangered species) would become unsuitable. Wintering bald eagles (endangered) could be adversely affected; however, present data are not sufficient to reliably estimate affects on regular populations of use areas.

In addition to the endangered peregrine falcon and bald eagle, six candidate bird species under review for endangered or threatened status may occur in or near the WSA. Before authorizing surface-disturbing activities (2,500 acres potential), BLM would conduct site-specific clearances of the potentially disturbed areas and would informally consult with FWS as required by BLM policy (refer to Appendix 4). If threatened or endangered species were found that could be affected, BLM would initiate formal Section 7 consultation with FWS under provisions of the Endangered Species Act, and appropriate mitigating measures would be applied. If threatened,

endangered, or sensitive species occur in the WSA, necessary measures would be taken to protect them and it can be reasonably concluded that the viability of populations of these species would be preserved under the No Action Alternative.

Big game populations would probably recover, although total range and carrying capacity would be reduced in the WSA. Loss of capacity for deer could be as much as 402 animals on critical winter range and 49 on summer range while elk carrying capacity could be reduced by 110 on winter range and 201 on summer range.

Vegetation treatment projects could be implemented, which might lead to increased carrying capacity for deer. However, since (1) winter forage is not now limiting for Herd Unit 27B; and (2) suitable areas for vegetation treatment exist outside the WSA to the south on the Big Horn Benches, the potential effect on deer would be negligible. Habitat for fish, including trout and threatened and endangered species, could be adversely affected by surface disturbance, changes in fishing patterns, or diversion or dam construction. A reservoir on the Green River would expand and improve habitat for trout and catfish but would be detrimental to endangered fish. About 2,000 acres of riparian habitat used by a large number of species would be lost. A water resource alternative favoring free flow of the Green River, such as Wild and Scenic River designation, would not adversely affect the endangered fish.

FOREST RESOURCES

As much as 11,400 cords of fuelwood could be utilized from the potential vegetation treatment areas proposed on Green River and Little Park Allotments. Travel distances and road conditions would continue to discourage use in the WSA. No woodland harvest is presently occurring and none is anticipated in the foreseeable future.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the Price River MFP. The 8,963 AUMs currently allocated within 15 allotments are controlled by 18 livestock permittees.

About 2,500 acres of the WSA could be disturbed by mineral exploration and development and 2,000 acres could be inundated by a reservoir. This could reduce the number of AUMs available by up to 136 AUMs for the short term until revegetation occurred on the disturbed areas at which time the forage would again be available. A permanent forage loss of about 100 AUMs would result if the 2,000-acre reservoir were developed.

DESOLATION CANYON WSA

However, approximately 195 additional AUMs could be gained through the potential vegetation treatment of 1,620 acres in the Green River and Little Park Allotments. Any change in livestock preferences would depend on the result of monitoring and the amount of forage available throughout the allotment. Use and maintenance of the existing six segments of fence, two reservoirs, and five improved springs could continue. Roads and new range developments could be implemented without wilderness considerations. One spring development, one small reservoir, and one diversion reconstruction are proposed.

Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue. Protection would continue as under the *Wild Horse and Burro Act* (USDI, BLM, 1971).

VISUAL RESOURCES

Approximately 22,000 acres of the WSA would be managed under VRM Class I, a special designation covering Desolation Canyon National Historic Landmark, and another 252,490 acres would be managed under VRM Class II objectives requiring that surface-disturbing activities not be generally apparent.

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by about 2,500 acres of surface disturbance from mineral and energy development and vegetation treatments would be degraded. VRM objectives would probably not be met in VRM Class I and II areas during the short term. Even after rehabilitation, some permanent localized degradation would be expected. If roads and drill pads are located throughout the 289,650 acres (worst-case analysis), visual qualities could be significantly reduced in the WSA as a whole. Class III and IV management acreages could receive some long-term visual impacts, with specific areas being affected to a significant degree. VRM Class III management objectives could be met on the 1,620 acres of potential vegetation treatment areas by designing the treatment to simulate a natural clearing. These intrusions could be considered permanent if treatment areas were regularly maintained. Scenic conditions along about 10.5 miles of the Green River and 4 miles of the Price River would be altered to reservoir conditions and VRM objectives would not be met if the potential 2,000-acre reservoir were developed.

CULTURAL RESOURCES

Protection of cultural values (including the Desolation Canyon National Historic Landmark, Flat

Canyon Archaeological District, and potential sites) would continue as currently provided. There is a potential for 2,500 acres of surface disturbance by mineral exploration and development and vegetation treatments that could occur under this alternative; also, 2,000 acres could be inundated by a reservoir. Inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance or inundation. Sites that would be inundated would be salvaged or moved. Consultation with the State Historic Preservation Officer would occur prior to approving any disturbance within the landmark. A determination of no significant impact would be required prior to any approval. Inadvertent loss or damage could occur in disturbed areas. Vandalism (not currently a problem) could be expected to increase in proportion to the general population increase.

RECREATION

The WSA would remain closed to ORV use except for the existing 29.5 miles of roads and trails and 5.5 miles of ways. Terrain and access in the WSA is generally restrictive to ORV use.

Up to 2,500 acres could be disturbed by mineral and energy and vegetation treatment activities (about 2,710 acres of disturbance is considered likely). Primitive recreational opportunities would be diminished on the affected areas. If roads, vehicular ways, and drill pads are located throughout the WSA (worst-case analysis), primitive recreational opportunities could be lost in the area altogether. However, roads and ways created for mineral exploration and development would improve access into the area for nonprimitive recreation. The vegetation treatments would also have short- and long-term impacts on sightseeing and primitive recreation because of the effects of intrusions on scenic and primitive values. A reservoir on the Green and Price Rivers would be a major obstacle to floatboaters and would result in a direct loss of about 10.5 miles of the Green River and 4 miles of the Price River. Several rapids would be inundated and a large proportion of the 65,000 visitor days related to floatboating would be lost.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent/year over the next 20 years. However, this is only true for a small portion of the recreation use in the Desolation

DESOLATION CANYON WSA

Canyon WSA. Approximately 60,000 visitor days annual use are associated with permitted private and commercial floatboating on the Green River in Desolation and Gray Canyons. This use level is considered to be near full capacity for the area and, without construction of a reservoir, is expected to increase by about 4,000 visitor days in the future. The remaining 8,000 visitor days annual use (3,000 visitor days land-based use and 5,000 visitor days water-based use not controlled by permits) would increase as projected. At this rate, overall recreational use is expected to increase from 68,000 current visitor days/year to 75,920 visitor days at the end of 20 years. If a reservoir were constructed, visitor use could be much higher in the future but would be related to use of motorized boats for fishing and other water sports rather than floatboating. Use would also shift from commercial to noncommercial.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would continue under the Price River MFP and Grand Resource Area RMP. Expected mineral and energy exploration and development, vegetation treatments, and a potential reservoir could alter about 4,500 acres. Naturalness values now existing could be impacted by the change. While imprints affect about 1 to 2 percent of the WSA, essentially all 289,650 acres now meet the naturalness criterion for areas under wilderness review. These values now existing in the WSA could be lost. Roads, producing wells, and other developments would be essentially permanent in nature. Loss of natural values on lands directly affected would negatively influence surrounding areas in the WSA as well.

The WSA would not be managed to preserve outstanding opportunities for solitude and such opportunities now existing could be lost in parts of the WSA. Rugged terrain could preserve some outstanding opportunities for solitude in about 65 percent of the WSA. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing and vehicle-associated activities that could occur in the area. This would reduce the visitor's opportunity to find a secluded spot in about 147,000 acres to less than outstanding. Outstanding opportunities would continue to exist in 142,650 acres. The small Range Creek wild horse herd and the potential habitat for sensitive plant and wildlife species are special features that would not receive the added protection of wilderness designation.

LAND USE PLANS AND CONTROLS

Not designating the WSA as wilderness would conform with Carbon County zoning, Emery

County zoning, and the *Grand County Master Plan*. Plans of other agencies would not be affected because management would continue as present.

Implementation of this alternative would be consistent with the management philosophy of the State of Utah, which emphasizes economic return from State school sections.

Implementation of this alternative would also be consistent with the Price River MFP and Grand Resource Area RMP. Recreation management of the Green River would continue as directed in the Desolation and Gray Canyons of the Green River Management Plan, unless the potential reservoir were installed. Proposed water diversions on Rock Creek and the Green River for irrigation and tar sand production could be given further consideration.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of implementation of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil, gas, coal, oil shale, and tar sand in the WSA were developed, it could lead to a significant increase in employment and income for Carbon, Emery, and Grand Counties. However, the probability of economic development of minerals within the WSA, other than for oil and gas, is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

If the potential reservoir is not developed, there would be no long-term livestock-related economic losses because the existing grazing use (8,963 AUMs) and ability to maintain, replace, and build new range developments would remain as at present. With reservoir development, about 100 AUMs that presently account for about \$2,000 in livestock sales and \$500 in ranchers' return to labor and investment annually would be permanently lost. However, the proposed vegetation treatments would produce 195 AUMs of new forage allocated to produce \$3,900 of livestock sales, including \$975 of ranchers' returns to labor and investment annually.

Recreational use of the WSA is currently estimated at 68,000 visitor days annually. About 3,000 visitor days are attributed to land-based use, while the remaining 65,000 visitor days are attributed to water-based use. The majority of this use is controlled by BLM's permit system and use could only increase from 60,000 to 64,000 visitor days because the Green River in Desolation and Gray Canyons is being operated at near full

capacity at the present time for the majority of the WSA's length. However, visitor days could increase in the lower end of the WSA where use on the Green River is unrestricted. Therefore, local expenditures related to 3,000 land-based and 5,000 water-based visitor days could increase at a rate of 2 percent/year over the next 20 years (49-percent increase over 20 years). This recreational use is estimated to increase from 8,000 to 11,920 visitor days/year over the next 20 years and would average \$4.10 per visitor day (only a portion of which contributes to the local economy). This recreation-related expenditure attributable to the WSA would likely not be significant to the local economy. The remaining 60,000 visitor use days are water-based and are estimated to include 30,000 visitor days annually for commercial use and 30,000 noncommercial visitor days annually. Recreation-related expenditures for these visitor days average \$4.10 per visitor day for commercial use. Because many of the operators are locally based much of the expenditures benefit the local economy.

Surface-impacting activities that would be allowed without designation would not be expected to reduce the demand for commercial outfitter services now offered in the area due to existing land use planning constraints. A reservoir on the Green River could greatly reduce commercial recreational use of the river but would probably increase overall visitation and recreation use of the WSA.

Existing oil and gas lease revenues would decrease by \$53,370 per year as 17,790 acres of existing leases would be phased out to meet Category 4 restrictions. However, there are 52,450 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to \$157,350 additional Federal lease fee revenues per year in addition to new royalties from lease production and bonus bids from new leases in KGSs. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$12,584 per year) would continue. An additional 195 AUMs that would be produced by proposed new range developments and possibly allocated to livestock under this alternative would increase Federal revenues by \$273 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects. However, loss of 100 AUMs due to reservoir development could reduce Federal livestock grazing fees by about \$140 per year.

All Wilderness Alternative (289,650 Acres)

As cited in the Description of the Alternatives section, major changes that could occur in the 289,650-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in oil and gas leasing Category 4 (closed to leasing). The WSA would also be closed to ORV use. It is assumed that the 1,620 acres of vegetation treatments would not be allowed. About 5.5 miles of ways in the WSA would be closed to vehicular use, except on approval by BLM as noted in the Description of the Alternatives section. Vehicular travel would continue to be allowed on the 29.5 miles of "cherry-stemmed" roads in the WSA. The area would be managed under VRM Class I.

For the following analysis it is assumed that existing mining claims (34 claims on 260 acres) would eventually be explored or developed. This exploration and development could cause an estimated 20 acres of disturbance along the face of the Book Cliffs at the south end of the Beckwith Plateau within the WSA. It is also assumed that post-FLPMA oil and gas leases would expire before production of commercial quantities. Pre-FLPMA leases in the Peters Point Unit and in the KGS in Rattlesnake Canyon would either be used for production or be explored and developed causing an estimated 20 acres of surface disturbance. Future leasing of oil and gas, coal, tar sand, and any other mineral resource leasing would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) It is also assumed that a potential reservoir on the Green River would not be allowed.

Because potentially disturbed and inundated areas would be smaller than under the No Action Alternative (40 vs. 4,500 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, and forest resources would be insignificant for the All Wilderness Alternative. Wilderness designation would provide additional protection to these resources. Other effects due to changes in management are discussed below.

SOILS

It is estimated that up to 40 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss is estimated at about 0.65 cubic yard/acre/year on undisturbed areas and 5.54 cubic yards/acre/year on disturbed

areas. Therefore, soil loss on the 40 acres would increase from 26 cubic yards/year to 222 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Maximum annual soil loss in the WSA would increase by approximately 196 cubic yards (0.1 percent) over current annual soil loss. Any erosion and sediment control benefits arising from the 1,620 acres of potential vegetation treatments and the potential reservoir on the Green River would be foregone under this alternative.

VEGETATION

The anticipated surface disturbance of 40 acres would not alter vegetation types in the WSA. Habitat for the five candidate or threatened plant species in the WSA would be protected from inadvertent disturbance resulting from development of the land.

WATER RESOURCES

Restraints on mineral development would protect water quality. The potential for increased soil erosion and sediment yield from 40 acres of mineral-related disturbance would be significantly less than changes in water quality discussed under the No Action Alternative. Increases in sediment loading are most likely in Upper Rattlesnake Canyon (KGS development) and possibly in Lower Jack Creek during periods of flow. However, with this alternative, benefits to the watershed and water quality from the potential 1,620 acres of vegetation treatments and the potential reservoir on the Green River would be foregone.

Mineral exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not be expected to significantly alter ground water flow or reduce ground water quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 206,200 acres (63,600 pre-FLPMA and 142,600 acres post-FLPMA) are under oil and gas lease in the WSA. Current gas production from the WSA (one producing well is located inside WSA boundaries in the Peters Point Field) would not be affected. Future production from pre-FLPMA leases in the Peters Point Field and the KGS in Rattlesnake Canyon would also not be affected. All leases within the Peters Point Unit are pre-FLPMA, are held by well established production, and have valid existing rights. Existing post-FLPMA leases would expire without

production and would not be reissued. About 83,450 acres in the WSA would remain unleased for oil and gas. About 52,450 of these acres are outside Category 4 areas and are presently open to leasing. Exploration for and development of that portion of the potential in-place resource of 10 to 60 million barrels of oil and 60 to 300 billion cubic feet of natural gas not located in the developed pre-FLPMA leases would be foregone. The most likely range for production which may be foregone, based on current information, would be up to 50 million barrels of in-place oil (16.7 million barrels recoverable) and up to 250 billion cubic feet of in-place natural gas (83.3 billion cubic feet recoverable). The remaining 3.3 million barrels of recoverable oil and 16.7 billion cubic feet of recoverable gas held in KGSs could be produced.

The most likely production foregone would be from pockets of gas along the Uncompahgre Uplift. About 13 miles of the Uplift are within the WSA. Exploration along the Uplift outside the WSA on the Big Horn Benches could continue. The combination of rugged topography and moderate potential in the remainder of the WSA diminishes the likelihood that exploration would occur and/or could physically limit potential drill sites and access. The relative potential of this area when compared to other areas, where only limited exploration has occurred, is uncertain.

Coal

About 50 to 70 million tons of recoverable coal (105 to 140 million tons are estimated to be in-place) could not be mined from the WSA. The recoverable coal underlies 2,900 acres of a known 8,000-acre coal-bearing zone in the Little Park portion of the WSA. Another 100,000 acres of the WSA are underlain by thin-bedded, low-grade coal. Most of this is more than 3,000 feet below the surface and is not considered recoverable. There are no coal leases in the WSA.

Tar Sand

The WSA has not been leased for tar sand. Tar sand leasing would not take place under this alternative. Less than 3 million barrels of recoverable oil from the tar sand resource in the WSA could be foregone. This is not considered a significant loss of the tar sand resource because more favorable deposits and possible development sites are located elsewhere and the areas within the WSA are at the margins of what could be considered a commercial deposit.

Oil Shale

Because there is essentially no potential for oil shale recovery from the WSA, loss of potential would not be significant.

DESOLATION CANYON WSA

Hydropower

Withdrawals for hydropower sites within the WSA are being reviewed and, in most cases, revoked by the Bureau of Reclamation. With the exception of one site, they are not expected to indicate high hydroelectric potential. One site has been identified as having potential for producing about 25 megawatts of power. No current proposal or expressed interest in this site is known to exist; however, under this alternative, dam construction could not take place.

Locatable Minerals

After designation, all 289,650 acres would be withdrawn from mineral location. About 127,780 acres are already withdrawn from mineral location by the oil shale withdrawal; therefore, the total withdrawal represents an additional 161,850 acres. The potential exists for less than 500 tons of uranium oxide, probably occurring as deposits in the Wasatch Formations at the base of the Roan Cliff.

About 260 acres of the WSA (along the Book Cliffs east of the Town of Green River) are covered by 34 mining claims. Development work, extraction, and patenting would be allowed to continue on that portion of existing claims that may be determined valid after wilderness designation under unnecessary or undue degradation guidelines. This exploration and development could result in an estimated surface disturbance of 20 acres, and the recovery of an undetermined amount of the uranium oxide deposit.

Salable Minerals

Wilderness designation would prohibit development of sand, gravel, and rock located in the WSA. The potential of resource development is low due to more favorable locations elsewhere. Prohibiting salable mineral development in the WSA would not be considered a significant impact.

WILDLIFE

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep that are sensitive to human presence and surface disturbance) would benefit by designation and the subsequent reduction of potential surface disturbance from about 2,500 acres to 40 acres. Black bear and mountain lion populations are considered healthy, and stable habitat conditions would maintain existing populations. Habitat for nesting raptors (WSA-wide), potentially including the endangered peregrine falcon (66,500 acres of habitat), would be protected. Potential significant loss of habitat for the endangered bald eagle would also be avoided, as would

loss of habitat for six other candidate, threatened, or endangered bird species.

Bighorn sheep range would be maintained in its present condition. Populations in the Range Creek and Book Cliffs herds would eventually expand to carrying capacity at 1,330 and 608 sheep, respectively.

Habitat for game species would be protected, including that for elk that are becoming reestablished. Deer and elk populations would be expected to expand to the carrying capacities shown in Tables 12 and 13. Habitat for fish species (including trout, three endangered, and one candidate threatened or endangered species) would be maintained.

Designation would preclude any form of habitat improvement and/or vegetation conversion projects. Water developments to aid in distribution could be restricted or prohibited. Loss of a potential vegetation treatment would not result in a major loss of potential wildlife habitat in the Desolation Canyon WSA because (1) winter forage is not limiting for the big game in the WSA; (2) suitable areas for vegetation conversion exist adjacent to or near the WSA; and (3) the WSA's topography reduces the feasibility of land treatments.

LIVESTOCK AND WILD HORSES

Present domestic livestock grazing would continue as authorized in the Price River Resource Area MFP and Grand Resource Area RMP. The 8,963 AUMs currently allocated in the WSA would remain available for livestock forage. Development of future roads or other livestock management facilities in the WSA could be restricted to preserve wilderness values. However, since little use of motorized vehicles is currently taking place to manage livestock in the WSA, little effect on the management of livestock is anticipated. A potential gain of 195 AUMs through vegetation treatments to 1,620 acres would not occur. The anticipated 40 acres of surface disturbance would not reduce the number of available AUMs.

Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue. Protection would continue as under the *Wild Horse and Burro Act*.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through management

DESOLATION CANYON WSA

under VRM Class I, which generally allows for only natural ecological change.

With this alternative, the possible disturbance of 40 acres for mineral exploration and development could occur. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. If roads for development of valid mining claims or pre-FLPMA oil and gas leases could not be denied, VRM Class I objectives might not be met on a larger portion of the WSA. Potential for development of locatable minerals is almost non-existent; however, potential for oil and gas development is high. Under this alternative, visual conflicts arising from 1,620 acres of potential vegetation treatments would not occur.

CULTURAL RESOURCES

The Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District would be within the designated wilderness. Designation would be consistent with the purpose of the historical landmark and the archaeological district.

Archaeological and historical sites would be protected from surface disturbance. Vandalism and/or accelerated deterioration from increased use might occur. Designation could make stabilization, physical protection, and/or scientific study more difficult because vehicle access could not be established and certain site work could be determined inappropriate in wilderness.

RECREATION

As discussed in the No Action Alternative, only that portion of recreational use of the WSA not associated with commercial or private permitted use on the Green River is estimated to increase over the next 20 years in relation to population increases and current trends of recreational use. If the WSA were not designated wilderness, total recreational use in the WSA would increase from the current 68,000 visitor days annually to 75,920 visitor days over the next 20 years. However, publicity about the WSA that would likely follow wilderness designation could lead to substantial increases in primitive recreational use above the baseline rate. Judging from use densities of a number of well known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distribution about the WSA; and the availability of similar sites; it is estimated that, following

designation, use could be as much as 93,965 visitor days per year (USDI, BLM, 1985). This is 25,965 visitor days over the area's current estimated 68,000 annual visitor days. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use and, due to the size and configuration of the WSA, the quality of the primitive recreation experience probably would not be negatively affected by the increased use. The entire 289,650 acres would be closed to ORV recreational use. Nearly all of the WSA is unsuitable and/or inaccessible for ORV use at present. About 5.5 miles of ways in the WSA would also be closed to ORV use. ORV play activity, vehicular hunting, and sightseeing in the WSA that could occur without designation would be eliminated from the WSA following wilderness designation. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the area. Commercial and private river outfitting under BLM's permit system would increase by about 4,000 visitor days as the Desolation and Gray Canyon areas of the Green River are being managed at near full capacity. However, other commercial operations relying on land-based recreational activities could apply for use of the WSA.

Mineral-related surface disturbance on up to 40 acres could cause localized impairment of primitive recreational values in the WSA, especially if it occurred in the form of roads. The likelihood of oil and gas development is high, while the likelihood for locatable mineral exploration or development is very low.

WILDERNESS VALUES

The entire WSA would be designated as wilderness, thus preserving wilderness values. Naturalness, opportunities for solitude and primitive, unconfined recreation, and special features would be maintained throughout the WSA, except on up to 40 acres that could be disturbed due to oil and gas development of pre-FLPMA leases in the Peters Point Field and the KGS in Rattlesnake Canyon and locatable mineral development. Development of locatable minerals is unlikely due to the presence of more favorable deposits elsewhere. This disturbance could affect wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the area as a whole.

The existing "cherry-stemmed" roads on Cedar Ridge (1.5 miles), north of Cedar Ridge Canyon (3.0 miles), to Nefertiti Rapid (7 miles) and the Beckwith Plateau road (18 miles) would penetrate the wilderness area. Other ways and imprints that

would not be traveled would become less noticeable due to lack of use and natural processes.

Overall, visitation to the area would be expected to increase to about 93,965 visitor days/year due to increased use of the WSA for hiking, climbing, camping, sightseeing, and horseback activities. However, floatboating use in Desolation and Gray Canyons would peak at 64,000 visitor days annually, as required by the River Management Plan. Demand for floatboating and other recreational uses is likely to increase; use will increase along the unpermitted river segment paralleling the road south of the WSA and, possibly, on the Price River. Demand could also broaden the spectrum of the national population outside the States of Utah, Colorado, and California using the WSA. The scenic and primitive setting of geological, historical, archaeological, and natural sightseeing features would be maintained. Protecting habitat for wildlife would increase the probability of sightings and scenic values would be maintained. Cultural and historical sites would be protected from and would continue to be used for sightseeing.

LAND USE PLANS AND CONTROLS

Because the State land within the WSA could be exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Neither the BLM Price River MFP or the Grand Resource Area RMP provide for wilderness designation. A decision by Congress to designate the WSA as wilderness would be an amendment to the MFP and RMP. Designation would be consistent with the Desolation and Gray Canyons of the Green River Management Plan.

Carbon County has zoned the area as Critical Environmental 1 (CE-1). This alternative would be generally consistent with the CE-1 zoning since many resource uses would continue, although under more restrictive conditions. Implementation of this alternative would not be consistent with Emery County's zoning for mining. Grazing would only be affected to the extent that future range developments might not be allowed in the WSA. The *Grand County Master Plan* identified no specific management plan or zoning for the WSA. However, the plan does not favor wilderness and generally emphasizes continuation of existing uses and maximizing mineral development. The proposed water diversions on Rock Creek and the Green River for irrigation and tar sand production would not be allowed.

SOCIOECONOMICS

Overall there would not be significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 18), as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate for oil and gas and low for other minerals (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed; however, designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$179,260 of livestock sales including \$44,815 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any potential increase in ranchers' income. Loss of potential for about 1,620 acres of vegetation treatments along with a potential increase of 195 AUMs would result in the loss of \$975 of ranchers' returns to labor and investment assuming that the additional AUMs would have been allotted for use.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). The WSA currently experiences 68,000 visitor days of use annually (65,000 water-based and 3,000 land-based). The majority of the water-based use, 60,000 visitor days annually, results from commercial and private permitted use on the Green River in Desolation and Gray Canyons. Since this is the near maximum use allowed on the river, use would not increase with designation. The 3,000 visitor days of land-based use and 5,000 visitor days of water-based use not controlled by BLM's permit system could increase

with designation. Related local expenditures from these increases would be small (average of \$4.10 per visitor day statewide).

Motorized ORV recreational use of the WSA is light, and the decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 142,600 acres of post-FLPMA leases would cause an eventual loss of up to \$427,800 per year of lease fees to the Federal Treasury as compared to the existing situation. There would also be a potential loss of up to \$157,350 annually in Federal revenues from the 52,450 acres that could be leased for oil and gas without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone. Potential coal leases on up to 8,000 acres would also be lost along with any Federal lease fees, bonus bids, or royalties.

If the proposed range improvements are not developed and used, an estimated annual \$273 of Federal grazing revenues from 195 increased AUMs would be foregone, assuming that the forage would have been allocated for use.

Wilderness designation would eliminate most woodland product harvesting and related Federal revenues. Because no harvest is presently occurring in the WSA, no Federal revenue is being generated or would be lost with designation.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increases. The opportunity of increasing commercial recreation in the WSA is limited and would be restricted to land-based uses. There are presently 26 commercial outfitters using the WSA.

Partial Wilderness Alternative (242,000 Acres) (Proposed Action)

The major activities that would occur in the portion of the WSA designated as wilderness for this alternative would be the same as described for the All Wilderness Alternative. For the area not designated as wilderness in the WSA, management would be as described for the No Action Alternative. The specific actions that would take place within the 242,000-acre area designated as wilderness and the 48,490-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, within the designated area, existing mining claims would eventually be explored and developed, causing an estimated 20 acres of surface disturbance; some of the pre-FLPMA oil and gas leases would also be developed, causing about 10 acres of surface disturbance. It is assumed that the remaining existing oil and gas leases in the designated portion would expire before production of commercial quantities, and coal development would not occur. Nonproducing oil and gas leases would not be renewed and future leasing of oil and gas, coal, tar sand, and oil shale would not be allowed.

It is assumed that, within the nondesignated area, up to 2,200 acres would be disturbed sometime in the future due to the exploration and development of oil and gas, tar sand, and coal and the implementation of potential vegetation treatments. Because the potential dam and reservoir site is within the potentially designated area, it is assumed that the reservoir would not be built with this alternative. Overall, a maximum of 2,230 acres of surface disturbance would occur within the WSA. This amount would be about 170 acres less than the disturbance estimated with the No Action Alternative and 2,190 acres more than the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on a maximum of 2,500 acres of surface disturbance, did not identify significant impacts to air quality, geology, and forest resources. Therefore, these resources would also not be significantly affected by this Partial Wilderness Alternative, which assumes up to 2,230 acres of surface disturbance.

Restrictions on management and development methods within the designated portion of the WSA would result in essentially the same impacts on development of water resources, mineral and energy resources, wildlife, livestock grazing, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

SOILS

It is estimated that up to 2,230 acres of soil could be disturbed by vegetation treatments and mineral exploration and development in the WSA. Of that, 30 acres would be within the portion designated as wilderness and 2,200 acres would be in the nondesignated area. The average rate of soil loss at present is estimated at 0.65 cubic yard/

acre/year on undisturbed areas and 5.54 cubic yards/acre/year on disturbed areas. Soil loss in the designated portion on the 30 acres would increase from 20 cubic yards/year to 166 cubic yards/year. Soil loss in the nondesignated portion on the 2,200 acres would increase from 1,430 cubic yards/year to 12,188 cubic yards/year. Overall, soil loss from the WSA would increase by about 10,904 cubic yards (5.7 percent) per year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

VEGETATION

The anticipated maximum of 2,200 acres disturbed within the nondesignated area would alter portions of certain vegetation types. Vegetation treatments on the Green River and Little Park Allotments would result in a change from existing piñon-juniper woodland vegetation to grassland. Acreage disturbed by energy developments in woodland or forest types would also result in the long-term removal of the dominant vegetation. Because of oil and gas leasing stipulations along the Green and Price Rivers, no significant disturbance of the riparian vegetation type is anticipated. Over time, disturbed areas would revert back to the original vegetation type unless they were retreated.

Within the designated portion, only 30 acres of surface disturbance are expected. Vegetation types would not be significantly affected compared to the No Action Alternative.

Five candidate or threatened plant species may occur within and near the WSA. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of potentially disturbed areas and would consult with the FWS as required by BLM policy (refer to Appendix 4). BLM would request a biological opinion when appropriate and would take necessary measures to protect these plants. Because necessary measures would be taken, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved with this alternative.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect water quality. Most erosion in the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development within the designated portion could impact 30 acres, with a soil loss increase of approximately 146 cubic yards

per year. Within the nondesignated portion, soil loss could increase by about 10,758 cubic yards per year.

Impacts to water resources for the designated wilderness portion would not be significant with this alternative. In the nondesignated area, water quality could be affected in certain areas such as Jack Creek by increased sediment loading and dissolved mineral concentrations. The most likely resource to be developed in the WSA is oil and gas. Oil and gas leasing categories and lease terms on leases issued after 1984 contain stipulations specifically designed to protect sensitive water resources.

An undetermined short-term increase in salinity could occur due to surface disturbances on Mancos-derived soils along the Green River in the south of the WSA. This increase is not expected to be significant due to the small amounts of Mancos-derived soils in the WSA.

The extent and quality of ground water in the WSA is not well known. However, the location of numerous springs and seeps in the WSA indicates ground water presence. In-situ mining of tar sand or underground mining of coal could disrupt ground water movement and lower ground water quality. Certain of the springs could dry up or experience reduced flow. Development of the oil and gas resource and the vegetation treatments would likely not affect ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Anticipated impacts to the oil and gas resource within the WSA would be similar to those discussed for the All Wilderness Alternative. However, 44,660 additional acres (48,490 nondesignated acres minus Category 4 acreage) would be available for less restrictive conventional oil and gas production, as discussed in the No Action Alternative.

Within the designated area, it is estimated that 1.5 to 13 million barrels of recoverable oil and 9 to 55 billion cubic feet of recoverable natural gas could be foregone. The most likely production foregone would be small pockets of gas along about 13 miles of the Uncompahgre Uplift. Exploration along the Uplift outside the WSA on the Big Horn Benches, however, could continue. The combination of rugged topography and higher resource potential in other portions of the WSA could diminish the likelihood that exploration would occur and/or could limit potential drill sites and access.

DESOLATION CANYON WSA

Potential production of oil and gas would not be foregone on pre-FLPMA leases in the designated portion of the WSA if exploration and production occurs before the current lease expires. Production from existing post-FLPMA leases or new leases issued could occur, providing development does not impair wilderness values present. About 57 percent of the Trail Canyon unit and 71 percent of the Rattlesnake Canyon unit would remain within the designated wilderness portion. The approximately 242,000 acres of wilderness would be placed in the no leasing category (Category 4).

The area within the nondesignated portion of the WSA was excluded primarily because of mineral resources. Most of the portion of the Greater Jack Canyon KGS within the WSA would not be in the wilderness area nor would additional acreage to the north with potential associated with Jack Creek anticline. The portion of the KGS in Rattlesnake Canyon within the WSA would also not be in the proposed wilderness. About 24,000 acres south of the Uncompahgre Uplift would also remain available for oil and gas exploration in Grand County, where deep Paleozoic rocks are known to be present. Oil and gas categories would remain as at present in the nondesignated portion. The wilderness stipulations on post-FLPMA leases would be lifted, and the estimated 1.5 to 5 million barrels of recoverable oil and 9 to 40 billion cubic feet of recoverable natural gas could be explored or developed without concern for wilderness values.

TABLE 19
Leasing Status
Large Partial Alternative

Type of Lease	Approximate Acres in Designated Area	Percent in Designated Area
Pre-FLPMA	56,000	23
Post-FLPMA	107,500	44
Not Leased	78,500	33
Total	242,000	100

Coal

About 50 to 65 million tons of moderate to high potential recoverable coal (up to 130 million tons in-place) are located within the nondesignated portion and could be mined without concern for wilderness values. The recoverable coal underlies 2,900 acres of an 8,000-acre coal-bearing area.

The 242,000-acre designated area is underlain by thin-bedded, low-grade coal. Most of this is more

than 3,000 feet below the surface and is not considered a viable recoverable resource. About 10 million in-place tons of coal, of which 5 million tons are considered potentially recoverable, is located in the designated portion of the WSA and could not be mined. There are currently no coal leases in either the designated or nondesignated portions of the WSA.

Tar Sand

Portions of the Sunnyside STSA, a potential competitive and tar sand lease tract, are located within the nondesignated area and could be developed without wilderness consideration. The area is estimated to contain 0.5 million barrels of recoverable oil from tar sand that could be developed without concern for wilderness values. An additional 2.5 million barrels of potentially recoverable oil from tar sand would be within the designated area and could not be explored or developed.

Oil Shale

Foregoing oil shale development possibilities in the designated portion of the WSA would not be considered a significant loss of resource because more favorable deposits and possible development sites are located elsewhere.

Hydropower

Withdrawals for hydropower sites within the designated portion of the WSA are being reviewed and, in most cases, revoked by the Bureau of Reclamation. With the exception of one site, they are not expected to indicate high hydroelectric potential. One site has been identified to potentially produce about 25 megawatts of power. No current proposal or expressed interest in this site is known to exist. Under this alternative, dam construction could not take place.

Locatable Minerals

Within the nondesignated acreage (48,490 acres), approximately 36,290 acres would be open to mining claim location. The remaining 12,200 acres would continue to be withdrawn to claim location until revocation of the oil shale withdrawal took place. The 34 existing mining claims covering 260 acres could be explored and developed, provided they are valid. The potential exists for less than 80 tons of uranium oxide in the nondesignated portion of the WSA.

Within the designated acreage (242,000 acres), the area would be closed to mining claim location. Approximately 115,600 acres are under the oil shale withdrawal. Presently, there are no mining claims located within the designated area. The

DESOLATION CANYON WSA

potential exists for a deposit of less than 420 tons of uranium oxide. Potential for development of any locatable minerals present would be foregone following wilderness designation.

Salable Minerals

Although sand, gravel, and rock are located in the WSA, the potential for development of these resources is low due to more favorable locations elsewhere. Wilderness designation would prohibit development of these resources.

WILDLIFE

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep that are sensitive to human presence and surface disturbance) would benefit within the designated wilderness area. Because black bear and mountain lion populations are considered healthy and stable, most of the habitat within the designated portions of the WSA would remain suitable and support present populations. Up to 9,072 acres of habitat in the nondesignated portion of the WSA might become unuseable for wildlife due to developments and human encroachment. Habitat for nesting raptors, including nearly all the peregrine falcon and bald eagle (both endangered species) habitat, would be protected within the designated area. Approximately 7,510 acres of raptor cliff nesting habitat could be rendered unsuitable within the nondesignated area due to development, while about 210 acres of potential peregrine falcon nesting habitat would become unsuitable. It is unlikely that significant impacts to bald eagles would occur as development would not encroach on the Green River.

In addition to the endangered peregrine falcon and bald eagle, six candidate bird species under status review may occur in or near the WSA. Before authorizing surface-disturbing activities (2,230 acres potential) BLM would conduct site-specific clearances of the potentially disturbed areas and would informally consult with FWS as required by BLM policy (refer to Appendix 4). If threatened or endangered species were found that could be affected, the BLM would initiate formal Section 7 consultation with the FWS under provisions of the Endangered Species Act, and appropriate mitigating measures would be applied. If threatened, endangered, or sensitive species occur in the WSA, necessary measures would be taken to protect them. Therefore, it can be reasonably concluded that the viability of populations of these species would be preserved.

Habitat for big game species would be protected within the designated portion, including that for

elk and bighorn sheep that are becoming reestablished in the WSA. Populations would continue to expand, although some carrying capacity and range would be lost due to development activities outside the designated area. Carrying capacity could be reduced by 347 deer and 48 elk on winter ranges, as well as 63 bighorn sheep. Carrying capacity for deer and elk on summer ranges would not be affected.

Habitat for fish species, including trout and threatened or endangered species, would be maintained and would not be affected in the nondesignated area.

LIVESTOCK AND WILD HORSES

Partial designation of 242,000 acres would affect domestic livestock grazing essentially the same as the All Wilderness Alternative. Grazing would continue as authorized in the Price River MFP and Grand Resource Area RMP. Of the 8,963 AUMs allocated in the WSA, 1,473 would be in the nondesignated portion and 7,490 within the designated portion. Development of future roads or other livestock management facilities for use with 7,490 AUMs in the designated portion would be restricted to preserve wilderness values. However, since little use of motorized vehicles is currently taking place to manage livestock in the WSA, little effect on livestock management is anticipated.

In the 48,490-acre nondesignated portion, grazing use of 1,473 AUMs would remain available for livestock as presently allotted. New range developments could be allowed in this area without concern for wilderness values. Surface disturbance associated with mineral development and vegetation treatments (2,200 acres) could temporarily reduce available AUMs until revegetation occurred. At that time, forage would again be available. Vegetation treatments affecting 1,620 acres in the Green River and Little Park Allotments could occur and would result in a forage production increase of about 195 AUMs per year.

Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue in both the designated and nondesignated portions. Protection would continue as under the *Wild Horse and Burro Act*.

VISUAL RESOURCES

Wilderness designation of 242,000 acres would contribute to the preservation of the area's visual quality. In the designated portion, the potential for surface-disturbing activities (30 acres) that could impair visual quality would be reduced through management under VRM Class I, which generally allows for only natural ecological

DESOLATION CANYON WSA

change. However, if the 30 acres of disturbance were to occur in the form of roads, VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation would be expected.

Within the 48,490-acre nondesignated area, even though mitigation measures would be applied to reduce visual contrasts created by intrusions, visual values in areas affected by the potential 2,200 acres of surface disturbance would be degraded. VRM Class II objectives would not be met during the short term. Even after rehabilitation, some permanent localized degradation could be expected. If roads and drill pads were developed throughout the nondesignated area, visual quality could be significantly reduced. In addition to roads and drill pads, VRM Class II management objectives would probably not be met on the 1,620 acres of potential vegetation treatment areas until the areas returned to natural vegetation.

CULTURAL RESOURCES

All of the Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District located within the WSA would be within the designated wilderness. The historical landmark would benefit, as designation would be consistent with the purpose of the landmark. The archaeological district would be protected from surface disturbance (only 30 acres estimated to occur).

Archaeological and historical sites would be protected from surface disturbance within the designated portion. However, vandalism and/or accelerated deterioration from increased use might occur. Designation could make stabilization, physical protection, and/or scientific study more difficult since vehicle access could not be established and certain site work could be inappropriate in a wilderness area.

Within the nondesignated area, potential exists for 2,200 acres of surface disturbance related to mineral exploration, development, and vegetation treatments. Inventories for the purposes of site recordation and mitigation of impacts would take place prior to this surface disturbance. Inadvertent loss or damage could occur in the disturbed areas. Vandalism (not currently a problem) could be expected to increase in proportion to the general population increase.

RECREATION

As discussed in the No Action Alternative, only that portion of recreation use of the WSA not associated with commercial or private permitted

use on the Green River is estimated to increase about 2 percent/year over the next 20 years. For this Partial Wilderness Alternative, total use levels in both the designated and undesignated portions of the WSA would be expected to increase to about 92,630 visitor days from the current level of 68,000 visitor days annually over the next 20 years. The majority of this increase would be land-based recreation use in the 242,000-acre wilderness area. The designated portion of the WSA would be closed to recreational ORV use. Nearly all of this area is unsuitable and/or inaccessible for ORV use at present. About 2 miles of ways in the Range Creek area would also be closed to vehicular use. In the nondesignated portion of the WSA, ORV use would be restricted to existing roads, ways, and trails.

Primitive recreational values within the 242,000 acres designated could be enhanced through protection from surface-disturbing activities. Only 30 acres of disturbance are estimated within the designated portion. Primitive recreation values within the nondesignated area, however, could be lost. Up to 2,200 acres of disturbance could occur and could result in the form of roads, drill pads, and vegetation treatments. Increased access to the area could increase motorized recreation activities in the general area. This increase could reduce primitive values present in the nondesignated portion of the WSA.

WILDERNESS VALUES

Impacts to wilderness values would be the same as discussed under the All Wilderness Alternative on 242,000 acres that would be designated wilderness. Naturalness, outstanding opportunities for solitude and primitive recreation, and special features found throughout the 242,000 acres would be preserved except on up to 30 acres that could be disturbed due to mineral development activities. This disturbance could affect wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the area as a whole.

The possible mineral-related surface disturbance of up to 2,200 acres on the nondesignated portion would be related to energy and mineral exploration and development and vegetation treatments. Mineral development and vegetation treatments could occur in the nondesignated portion without concern for wilderness values.

Exploration of oil and gas, coal, and tar sand could introduce roads, drill sites, and facilities, reducing the naturalness of the nondesignated portion of the WSA. Reclamation potential for abandoned drill sites would be fair to poor. Slopes

DESOLATION CANYON WSA

would not be expected to be as severe a limiting factor as in other parts of the WSA. Additional acreage surrounding noticeable imprints would be affected by sights and sounds associated with surface disturbance.

Outstanding opportunities for solitude would be preserved throughout the designated wilderness. About 45,590 acres (16 percent of the area) with outstanding opportunities for solitude would be in the nondesignated portion and would not receive the protection of wilderness designation. Topographic and vegetation screening would be unaltered and the user would be able to find secluded areas.

Portions of the WSA not designated as wilderness would not be managed to preserve outstanding opportunities for solitude. Topographic and vegetation screening could be altered in localized areas of surface disturbance where cuts and fills are constructed or trees and large shrubs are removed. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing and vehicle activities occurring with development and road access. This would reduce the visitor's opportunity to find secluded areas. Supplemental values (e.g., scenic and cultural features) and sensitive wildlife habitat could also be negatively influenced within the nondesignated portion and could possibly be foregone.

Visitation to the area would be expected to increase to about 92,630 visitor days/year due to the increased use of the designated wilderness for hiking, climbing, camping, sightseeing, and horseback activities (refer to the All Wilderness Alternative). A variety of opportunities would be retained in the WSA. About 48,490 acres (17 percent) of the area presently offering outstanding opportunities for primitive recreation would not be designated wilderness. The headwaters of Rock Creek, the primary source presently used for potable water, would be included within the designated wilderness. Most major sightseeing attractions (cultural, historical, and geologic) would remain within the area designated. Unroaded portions of the river corridor would remain intact within the WSA. In areas not designated, opportunities could shift over time from primitive recreation to roaded-natural or rural with the introduction of development and roads. Opportunities would become less than outstanding as the primitive setting is converted to a roaded area.

LAND USE PLANS AND CONTROLS

Because State land within the designated portion of the WSA would be exchanged for lands outside

the wilderness area, wilderness designation of 242,000 acres would not conflict with the policy of the State of Utah to maximize economic returns. Management of the 48,490-acre portion of the WSA not designated wilderness would be in conformance with the land management philosophy of the State of Utah.

Neither the BLM Price River MFP nor the Grand Resource Area RMP provides for wilderness designation. A decision by Congress to designate 242,000 acres of the WSA as wilderness would be an amendment to the MFP and RMP. The remaining 48,490 acres in the nondesignated portion of the WSA would be managed consistent with the multiple-use directions of the MFP or RMP. Partial wilderness designation would also be consistent with the Desolation Canyon National Historical Landmark and Flat Canyon Archaeological District designations and use of lands under those designations inside and outside the WSA. It would also be consistent with the Desolation and Gray Canyons of the Green River Management Plan.

Implementation of this alternative would generally be consistent with Carbon County's CE-1 zoning (refer to Affected Environment) since many resource uses would continue, although under more restrictive conditions. The *Grand County Master Plan* does not favor wilderness and generally emphasizes continuation of existing uses and maximizing mineral development. The *Emery County Master Plan* favors mining and grazing. Wilderness designation of 242,000 acres would not be consistent with this plan for mining. Grazing would only be affected to the extent that future range developments might not be allowed in the designated wilderness portion. The proposed water diversions for irrigation and tar sand development on Rock Creek and the Green River would not be allowed.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 18) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate for oil and gas and low for other minerals (refer to the Mineral and Energy Resources section for a discussion of the WSA's

mineral character). Valid existing oil and gas leases and mining claims could be developed, but designation would preclude new leases and claims from being established in the designated portion of the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by partial wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$179,260 of livestock sales, including \$44,815 of ranchers' return to labor and investment. Proposed improvements for livestock would not be foregone as potential vegetation treatments in the WSA would be located outside of the designated wilderness area. If these treatments were implemented, 195 additional AUMs of forage would be generated and ranchers' returns to labor and investment would increase by \$975 if additional AUMs were allotted for use.

Increased public awareness of the area resulting from wilderness designation of 242,000 acres could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

Motorized ORV recreational use of the WSA is light and closure of the designated portion to ORV use would result in an insignificant decrease in related local expenditures.

The loss of 163,500 acres now leased for oil and gas would cause an eventual loss of up to \$490,500 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$153,990 annually in Federal revenues from the 51,330 acres that could be leased without designation. About 44,960 acres in the designated portion (including 17,790 acres presently leased) are currently not available for oil and gas leasing (Category 4) and would not, therefore, be considered a potential resource loss from wilderness designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter

services increases. There are presently 26 commercial outfitters using the WSA, and designation could lead to more commercial recreational use in the WSA.

Partial Wilderness Alternative (143,350 Acres)

The major activities that would occur in the designated wilderness portion for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The actions that would take place within the 143,350-acre area designated as wilderness and the 146,300-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, certain pre-FLPMA oil and gas leases would eventually be explored and developed, causing an estimated 10 acres of surface disturbance. It is also assumed that all remaining existing oil and gas leases in the designated portion would expire before production of commercial quantities and not be renewed and future leasing of oil and gas or coal would not be allowed.

It is estimated that, in the nondesignated portion of the WSA, with overlap in mineral area development and vegetation treatment, up to 2,400 acres would be disturbed sometime in the future due to the exploration and development of oil and gas, tar sand, uranium, and coal resources and implementation of vegetation treatments in the Green River and Little Park Allotments. Overall, about 2,410 acres of surface disturbance would occur within the WSA. This amount would be about 90 acres less than under the No Action Alternative and 2,370 acres more than the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 2,500 acres of surface disturbance, would not significantly affect air quality, geology, and forest resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes up to 2,410 acres of surface disturbance.

Restrictions on management and development methods within the designated portion of the WSA would result in essentially the same impacts on development of water resources, mineral and energy resources, wildlife, livestock grazing, and land use plans as described for the All Wilderness

DESOLATION CANYON WSA

Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

SOILS

It is estimated that up to 2,410 acres of soil could be disturbed by vegetation treatments and mineral exploration and development in the WSA. Of that, 10 acres would be within the designated portion and 2,400 acres would be in the nondesignated area. The average rate of soil loss at present is estimated at 0.65 cubic yard/acre/year on undisturbed areas and 5.54 cubic yards/acre/year on disturbed areas. Soil loss in the designated portion on the 10 acres would increase from 7 cubic yards/year to 55 cubic yards/year. Soil loss in the nondesignated portion on the 2,400 acres would increase from 1,560 cubic yards/year to 13,296 cubic yards/year. Overall, soil loss from the WSA would increase by about 11,784 cubic yards per year (6 percent). Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

VEGETATION

The anticipated maximum of 2,400 acres disturbed within the nondesignated area would alter portions of certain vegetation types. Vegetation treatments (1,620 acres) on Green River and Little Park Allotments would result in a change from pinyon-juniper woodland to grassland. Acreage disturbed by energy development in woodland or forest types would also result in the long-term removal of the dominant vegetation. Because of stipulations on leases along the Green and Price Rivers, no significant disturbance of the riparian vegetation type is anticipated. Over time, disturbed areas would revert back to the original vegetation type unless they are retreated.

Within the designated portion, only 10 acres of surface disturbance are expected. Therefore, vegetation types would not be significantly affected.

Five candidate or threatened plant species may occur in or near the WSA. BLM would conduct site-specific clearances of potentially disturbed areas before allowing surface-disturbing activities. BLM would initiate Section 7 consultation with FWS as necessary. Because required measures would be taken to protect these plants, the viability of populations of threatened, endangered, or sensitive plant species would be preserved.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect water quality. Most erosion in the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development within the designated portion could impact 10 acres, with a soil loss increase of approximately 48 cubic yards/year. Within the nondesignated portion, about 11,736 cubic yards/year of soil loss increase could occur. The impact to water resources for the designated portion in this alternative would not be significant. In the nondesignated area, water quality could be affected in certain areas by increased sediment loading and dissolved mineral concentrations. The most likely resource to be developed in the WSA is oil and gas. Oil and gas leasing categories and lease terms on leases issued after 1984 contain stipulations specifically designed to protect sensitive water resources.

An undetermined short-term increase in salinity could occur due to surface disturbances on Mancos-derived soils where the Price River enters the WSA and along the Green River south of the WSA. This increase is not expected to be significant due to the small amounts of Mancos-derived soils in the WSA.

The extent and quality of the ground water in the WSA is not well known. However, the location of numerous springs and seeps in the WSA indicates ground water presence. In-situ mining of tar sand or underground mining of coal could disrupt ground water movement and lower ground water quality. Some of the 12 springs could dry up or experience reduced flow. Development of the oil and gas resource and the chaining-and-seeding projects would likely not affect ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Anticipated impacts to the oil and gas resource within the 143,350-acre area designated as wilderness would be similar to those discussed in the All Wilderness Alternative. Anticipated impacts to the oil and gas resource within the 146,300-acre area not designated as wilderness would be similar to those discussed in the No Action Alternative.

Within the designated portion of the WSA, it is estimated that 1.5 to 7.0 million barrels of recov-

erable oil and 9 to 35 billion cubic feet of recoverable natural gas could be foregone. The most likely production foregone would be small pockets of gas along the Uncompahgre Uplift. The combination of extremely rugged topography and higher resource potential in other portions of the WSA diminishes the likelihood that exploration would occur and/or could limit potential drill sites and access.

Potential production of oil and gas within the designated area would not be foregone on certain pre-FLPMA leases if exploration and production occurs before the current lease expires. Approximately 3 million barrels of oil and 5 billion cubic feet of natural gas could be recovered from the designated portion of the WSA. About 57 percent of the Trail Canyon Unit would be within the area proposed for wilderness designation, while none of the Peters Point or Rattlesnake Canyon Unit would be within the designated area.

Areas placed within the nondesignated portion of the WSA were based primarily on mineral resources. Current and future mineral production from Peters Point KGS would not be affected by wilderness designation. All moderate potential oil and gas areas, except where they overlap the river corridor, would be available for exploration and development. These areas include the Jack Creek anticline and an area extending 4 miles or more on either side of the Uncompahgre Uplift. No KGSs would be within the designated area.

Oil and gas categories would remain the same as at present in the nondesignated portion. The wilderness stipulations on post-FLPMA leases would be removed, and the estimated 1.5 to 10 million barrels of recoverable oil and 9 to 60 billion cubic feet of recoverable natural gas could be explored or developed without concern for wilderness values.

TABLE 20
Leasing Status
Small Partial Alternative

Type of Lease	Approximate Acres in Designated Area	Percent in Designated Area
Pre-FLPMA	23,200	16
Post-FLPMA	93,600	65
Not Leased	26,550	19
Total	143,350	100

Coal

About 50 to 70 million tons of moderate to high potential recoverable coal could be mined within

the nondesignated portion and surface facilities could be located without concern for wilderness values (105 to 140 tons of coal are estimated to be in-place). The recoverable coal underlies 2,900 acres of the known 8,000-acre area.

Another 100,000 acres of the designated area are underlain by thin-bedded, low-grade coal. Most of this is more than 3,000 feet below the surface and is not considered a viable recoverable resource. There are currently no coal leases in either the designated or undesignated portions of the WSA.

Tar Sand

The 1,640-acre portion of the Sunnyside STSA located in the WSA, including the potential tar sand lease tract, would be within the nondesignated area. Less than 3 million barrels of oil from tar sand resources could be recovered without concern for wilderness values.

Oil Shale

The foregoing of development possibilities in the wilderness portion of the WSA would not be considered a significant loss of resource because more favorable deposits and possible development sites are located elsewhere.

Hydropower

Withdrawals for hydropower sites within the designated portion of the WSA are being reviewed and, in most cases, revoked by the Bureau of Reclamation. With the exception of one site, they are not expected to indicate high hydroelectric potential. One site has been identified to potentially produce about 25 megawatts of power. No current proposal or expressed interest in this site is known to exist. Under this alternative, dam construction could not take place.

Locatable Minerals

Within the nondesignated acreage (146,300 acres), approximately 133,700 acres would be open to mining claim location. The remaining 12,600 acres would continue to be withdrawn to claim location until revocation of the oil shale withdrawal. The 34 existing mining claims covering 260 acres could be explored or developed, provided they are valid. The potential exists for less than 250 tons of uranium oxide in the nondesignated portion of the WSA.

Within the designated acreage (143,350 acres), the area would be closed to mining claim location. Approximately 115,180 acres are withdrawn from mineral location for oil shale reserves. Presently, there are no mining claims located within the

designated area. The potential exists for a deposit of less than 250 tons of uranium oxide. Development of this potential resource would be foregone following wilderness designation.

Salable Minerals

Although sand, gravel, and rock are located in the WSA, the potential for development of these resources is low due to more favorable locations elsewhere. Wilderness designation would prohibit development of these resources.

WILDLIFE

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep, which are sensitive to human presence and surface disturbance) would benefit within the designated area. Black bear and mountain lion populations are considered healthy and stable, and much of the higher quality habitat coinciding with deer winter and summer range (not yearlong) would remain within the designated area.

Habitat for nesting raptors, potentially including the endangered peregrine falcon, would be protected within the designated area. To the extent future development occurs in the nondesignated portion, nesting raptors along the Book Cliffs could be negatively affected. Approximately 9,200 acres of raptor cliff nesting habitat along the Roan Cliff could be rendered unsuitable. About 5,040 acres of peregrine falcon habitat would become unsuitable. The potential for impacts to wintering bald eagles (endangered) is uncertain. The area of concern would be along the Green River north of the Nefertiti/Swasey's Road where the designated area narrows to the rims of Gray Canyon.

Most of the higher quality Rocky Mountain bighorn sheep habitat would be within the designated wilderness; however, about 10,760 acres of habitat would be within the nondesignated portion and could be affected by human encroachment and disturbance. Carrying capacity for bighorn sheep could be reduced by 79 animals.

Habitat for other big game species would be protected within the designated portion, including that for elk that are becoming reestablished. However, habitat loss and human encroachment in the nondesignated areas would reduce carrying capacities by 354 deer on winter range, 25 deer on summer range, 69 elk on winter range, and 100 elk on summer range.

In addition to the endangered peregrine falcon and bald eagle, six candidate bird species under status review may occur in or near the WSA.

Before authorizing surface-disturbing activities (2,410 acres potential), BLM would conduct site-specific clearances of the potentially disturbed areas and would informally consult with FWS as required by BLM policy (refer to Appendix 4). If threatened or endangered species were found that could be affected, the BLM would initiate formal Section 7 consultation with the FWS under provisions of the Endangered Species Act, and appropriate mitigating measures would be applied. Therefore, it can be reasonably concluded that the viability of populations of these species would be preserved.

Habitat for fish species, including trout and threatened or endangered species would be maintained and would not be affected in the nondesignated portion.

LIVESTOCK AND WILD HORSES

Partial wilderness designation of 143,350 acres would affect domestic livestock grazing essentially the same as for the All Wilderness Alternative. Grazing would continue as authorized in the Price River MFP and Grand Resource Area RMP. Of the 8,963 AUMs allocated in the WSA, 4,528 would be in the nondesignated portion and 4,435 within the designated portion. Development of future roads or other livestock management facilities for use with 4,435 AUMs in the designated portion could be restricted to preserve wilderness values. However, since little use of motorized vehicles is currently taking place to manage livestock in the WSA, little effect on livestock management in the WSA is anticipated.

In the 146,300-acre nondesignated portion, grazing use of 4,528 AUMs would remain available for livestock as presently allotted. New range developments could be allowed in this area without concern for wilderness values. Surface disturbance associated with mineral development and vegetation treatments (estimated 2,400 acres disturbed) could temporarily reduce the number of available AUMs until revegetation occurs. At that time, forage production could actually increase over existing levels. For example, vegetation treatments affecting 1,620 acres in the Green River and Little Park Allotments could occur and would result in an increase of about 195 AUMs, if additional AUMs are allocated for use.

Grazing by the Range Creek wild horse herd (about 25 animals) would be allowed to continue in both the designated and nondesignated portions. Protection would continue as under the *Wild Horse and Burro Act*.

VISUAL RESOURCES

Wilderness designation of 143,350 acres would contribute to the preservation of the area's visual quality. In the designated portion, the potential for surface-disturbing activities (10 acres) that could impair visual quality would be reduced through management under VRM Class I, which generally allows for only natural ecological change. However, if the 10 acres of disturbance were to occur in the form of roads, VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected.

Within the 146,300-acre nondesignated area, even though mitigating measures would be applied to reduce visual contrasts created by intrusions, visual values in areas affected by the potential 2,400 acres of surface disturbance would be degraded. VRM Class II objectives would not be met during the short term. Even after rehabilitation, some permanent localized degradation could be expected. If roads and drill pads were developed throughout the nondesignated area (worst-case analysis), visual quality could be significantly reduced.

CULTURAL RESOURCES

All of the Desolation Canyon National Historical Landmark and the Flat Canyon Archaeological District within the WSA would be within the designated wilderness. The historical landmark would benefit, as designation would be consistent with the purpose of the landmark. The archaeological district would be protected from surface disturbance. Archaeological and historical sites would be protected from surface disturbance (only 10 acres) within the designated area. However, vandalism and/or accelerated deterioration from increased use might occur. Designation could make stabilization, physical protection, and/or scientific study more difficult as vehicle access could not be established and certain site work could be determined inappropriate in a wilderness area.

Within the nondesignated area, the potential exists for 2,400 acres of surface disturbance related to mineral exploration and development and vegetation treatments. Inventories for the purposes of site recordation and impact mitigation would take place prior to this surface disturbance. Inadvertent loss or damage could occur in the disturbed areas. Vandalism (not currently a problem) could be expected to increase in proportion to the general population increase.

RECREATION

As discussed in the No Action Alternative, only that portion of recreation use of the WSA not associated with commercial or private permitted use on the Green River is estimated to increase about 2 percent/year over the next 20 years. For this Partial Wilderness Alternative, total use levels in both the designated and undesignated portions of the WSA would be expected to increase to about 82,765 visitor days from the current level of 68,000 visitor days annually over the next 20 years. The majority of this increase would be land-based recreation use in the 143,350-acre wilderness area. The 143,350 acres, including 3.5 miles of way in the designated portion of the WSA, would be closed to recreational ORV use. Nearly all of this area is unsuitable and/or inaccessible for ORV use at present. In the nondesignated area, ORV use would remain limited to existing roads and trails.

Primitive recreation values within the 143,350 acres designated could be enhanced through protection from surface-disturbing activities. Only 10 acres of disturbance are estimated within the designated portion. Primitive recreation values within the nondesignated area, however, could be lost. Up to 2,400 acres of surface disturbance could occur and could result in the form of roads, drill pads, and vegetation treatments. Increased access to the area could increase motorized recreation activities in the general area. This increase and pressure could reduce primitive values present in the nondesignated portion of the WSA.

WILDERNESS VALUES

Impacts to wilderness values would be the same as discussed under the All Wilderness Alternative on 143,350 acres that would be designated wilderness. Naturalness, outstanding opportunities for solitude and primitive recreation, and special features found throughout the 143,350 acres would be preserved, except on up to 10 acres that could be disturbed due to mineral development activities. This disturbance could affect wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the areas as a whole.

The possible mineral-related surface disturbance of up to 2,400 acres on the nondesignated portion would be related to energy and mineral exploration and development and vegetation treatments. Mineral development and vegetation treatments could occur in the nondesignated portion without concern for wilderness values.

The naturalness of the areas not designated could be negatively affected. Exploration of oil and gas,

DESOLATION CANYON WSA

coal, and tar sand could introduce roads, drill sites, and facilities. Reclamation potential for abandoned drill sites would be fair to poor. Slopes would not be expected to be as severe a limiting factor as in other parts of the WSA. Additional acreage surrounding noticeable imprints would be affected by sights and sounds associated with surface disturbance.

Outstanding opportunities for solitude would be preserved throughout the designated wilderness. Topographic and vegetation screening would be unaltered and the user would be able to find secluded areas.

Portions of the WSA not designated wilderness would not be managed to preserve outstanding opportunities for solitude. About 143,400 acres (50 percent of the acres offering outstanding opportunity for solitude) would not receive wilderness protection. Topographic and vegetation screening could be altered in localized areas of surface disturbance where cuts and fills are constructed or trees and large shrubs are removed. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing and vehicle activities that might occur with development and road access. This would reduce the visitor's opportunity to find secluded areas. No vistas from the rims of the Book Cliffs would remain in the WSA.

Outstanding opportunities for primitive recreation would be preserved in the 143,350 acres designated, while opportunities would become less than outstanding as the primitive setting could become roaded in 146,300 acres not designated.

LAND USE PLANS AND CONTROLS

Because State land within the designated portion of the WSA would be exchanged for lands outside the wilderness area, wilderness designation of 143,350 acres of the WSA would not conflict with the policy of the State of Utah to maximize economic returns. Management of the 146,300-acre portion of the WSA not designated wilderness would be in conformance with the land management philosophy of the State of Utah.

Neither the BLM Price River MFP or the Grand Resource Area RMP provide for wilderness designation. A decision by Congress to designate 143,350 acres of the WSA as wilderness would be an amendment to the MFP and RMP. The remaining 146,300 acres in the nondesignated portion of the WSA would be managed consistent with the MFP and RMP. Partial wilderness designation would also be consistent with the Desolation

Canyon National Historical Landmark and Flat Canyon Archaeological District designations and use of lands under those designations inside and outside the WSA. It would also be consistent with the Desolation and Gray Canyons of the Green River River Management Plan. Implementation of this alternative would generally be consistent with Carbon County's CE-1 zoning (refer to Affected Environment section) since many resource uses would continue, although under more restrictive conditions. The *Grand County Master Plan* does not favor wilderness and generally emphasizes continuation of existing uses and maximizing mineral development. The *Emery County Master Plan* favors mining and grazing. Wilderness designation of 143,350 acres would not be consistent with this plan for mining. Grazing would only be affected to the extent that future range developments might not be allowed in the designated portion. The proposed water diversions on Rock Creek and the Green River for irrigation and tar sand development would not be allowed.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 18) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate for oil and gas and low for other minerals (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed, but designation would preclude new leases and claims from being established in the designated portion of the WSA. Precluding mineral exploration and development would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$179,260 of livestock

DESOLATION CANYON WSA

sales, including \$44,815 of ranchers' return to labor and investment. Proposed improvements for livestock would not be foregone as potential vegetation treatments in the WSA would be located outside of the designated wilderness area. If these treatments were to be implemented, 195 additional AUMs of forage would be generated and ranchers' returns to labor and investment would increase by \$975 if additional forage is allocated for use.

Increased public awareness of the area resulting from designation of 143,350 acres of the WSA could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

Motorized ORV recreational use of the WSA is light and closure of the wilderness portion of the WSA to ORV use would result in an insignificant decrease in related local expenditures.

The loss of 116,800 acres now leased for oil and gas would cause an eventual loss of up to \$350,400 per year of lease fees to the Federal Treasury. There are no acres in the designated portion that could be leased without designation because of Category 4 restrictions. About 44,340 acres in the designated portion are currently not available for oil and gas leasing (Category 4) and are, therefore, not considered a potential resource loss as a result of wilderness designation. In addition to rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation. Recreation-related Federal revenues could increase if the demand for commercial outfitter services increases. There are presently 26 commercial outfitters using the WSA, and designation could lead to more commercial recreational use in the WSA.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Carbon County Commission. 1981. *The Development Code of Carbon County, Ordinance No. 155*. December 28, 1981.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David T. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Schreyer, Richard, and Martin, L. Nielson. 1978. "Westwater and Desolation Canyons White-water River Recreation Study." Institute for the Study of Outdoor Recreation and Tourism, Department of Forestry and Outdoor Recreation, College of Natural Resources, Utah State University, Logan, Utah.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of WSAs Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1972. "Grand Resource Area Unit Resource Analysis" (unpublished document). January 12, 1972. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.

DESOLATION CANYON WSA

- U.S. Department of the Interior, Bureau of Land Management. 1979a. "Draft River Management Plan" (unpublished document). July 1979. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U. S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981a. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981b. "Price River Planning Unit, Unit Resource Analysis" (unpublished document). Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1982c. "Price River Planning Unit Management Framework Plan" (unpublished document). March 1982. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Resource Management Plan, Final Environmental Impact Statement*. December 1983. U.S. Government Printing Office, Denver, Colorado.
- U. S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. June 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984c. *Sunnyside Combined Hydrocarbon Lease Conversion Final Environmental Impact Statement*. August 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. October 1979. Salt Lake City, Utah.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan—1980 SCORP*. Salt Lake City, Utah.

DESOLATION CANYON WSA

Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely

Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Turtle Canyon WSA



TURTLE CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative (Proposed Action)	4
Partial Wilderness Alternative	7
Summary of Environmental Consequences	9
AFFECTED ENVIRONMENT	12
Air Quality	12
Geology	12
Soils	13
Vegetation	13
Water Resources	14
Mineral and Energy Resources	14
Wildlife	17
Forest Resources	18
Livestock and Wild Horses/Burros	18
Visual Resources	19
Cultural Resources	19
Recreation	19
Wilderness Values	20
Land Use Plans and Controls	21
Socioeconomics	22
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	24
Analysis Assumptions and Guidelines for All Alternatives	24
No Action Alternative	24
All Wilderness Alternative (Proposed Action)	28
Partial Wilderness Alternative	32
BIBLIOGRAPHY	37

TURTLE CANYON WSA

(UT-060-067)

INTRODUCTION

General Description of the Area

Turtle Canyon Wilderness Study Area (WSA) lies in Emery County, Utah, and is about 14 miles long, northwest to southeast, and 4 to 6 miles wide. It is managed by the BLM Moab District's Price River Resource Area and includes approximately 33,690 acres of public land. Three State sections totaling 1,928.64 acres are located within the WSA. The communities of Sunnyside and East Carbon City are located about 8 miles northwest of the WSA, while the community of Green River lies about 24 miles south.

The WSA forms a rugged divide between the Little Park Plateau above the Book Cliffs to the southwest and Range Creek Canyon to the northeast. Turtle Canyon runs along the southern boundary to its confluence with Range Creek. The WSA is separated from the Desolation Canyon WSA by roads adjacent to Range Creek and in Turtle Canyon.

The climate of the WSA is semiarid with annual average precipitation ranging from 8 to 20 inches, roughly split between winter snow and summer thunderstorms. Annual potential evaporation exceeds annual precipitation.

The WSA is characterized by severe topographic relief with elevations ranging from about 4,800 feet in Turtle Canyon to over 9,300 feet south of Little Horse Canyon. Vegetation varies among Douglas fir, pinyon, juniper, mountain shrub, sagebrush, grass, and rock outcrop. Water is present through much of the WSA. Rock formations exposed at the surface include those between the Green River and Price River Formations. Surface features include rugged, irregular ridgelines, numerous peaks, unusual rock pinnacles and balanced rocks, thin-bedded red, buff, brown, and gray rock, blocky sandstone remnants, and steep V-shaped canyons.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the BLM Price River Resource Area are discussed in Volume I. Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in analyses of individual WSAs.

Seven specific issues pertaining to the Turtle Canyon WSA were identified through formal public scoping (USDI, BLM, 1984a) and are responded to below:

1. *Comment:* A large portion of this WSA needs and lends itself to mechanical development of deer winter range. Vegetation manipulation and improvement are necessary to maintain a viable deer herd in this area.

Response: The portion of the winter range for mule deer Herd Unit 27B located in the WSA is not considered a limiting factor for mule deer viability at this time. Under the All Wilderness Alternative, certain wildlife developments would be allowed as long as criteria (refer to Appendix 1) are met to adequately protect wilderness values (refer to Affected Environment, Wildlife section). However, these developments would not include mechanical vegetation manipulation.

2. *Comment:* Wilderness designation would protect Range Creek, a Nationwide Rivers Inventory segment with potential for study and addition to the National Wild and Scenic Rivers System.

Response: Range Creek flows adjacent or near the WSA for several miles, and approximately 1 mile actually flows within the WSA. A discussion of protection of this river segment in relation to the National Wild and Scenic Rivers system is included in this document.

3. *Comment:* Does this area have oil, gas, and coal potential?

Response: The WSA has up to 10 to 50 million barrels of in-place oil, 60 to 300 billion cubic feet of in-place natural gas, and 55 million tons of in-place coal, as identified in the Science Applications, Inc. (SAI, 1982) report. Of this amount, it is estimated that 3 to 15 million barrels of oil, 18 to 90 billion cubic feet of natural gas, and 27 million tons of coal could be recovered.



4. *Comment:* The WSA contains a homestead, agricultural fields, and an extensively used way/road to the Green River.

Response: The homestead and agricultural lands are private lands located adjacent to, but not within, the WSA and would not be affected by wilderness designation. It is assumed that the extensively used way/road referred to is either the Range Creek or Turtle Canyon Road. Both roads run adjacent to, but do not enter, the WSA and would not be affected by wilderness designation.

5. *Comment:* The Environmental Impact Statement (EIS) should discuss land use conflicts as a result of wilderness designation.

Response: The Environmental Consequences, All Wilderness Alternative section, discusses any land use conflicts that could result from wilderness designation.

6. *Comment:* The WSA should be excluded from designation. Other areas could be reduced in size. Also, wilderness should be limited to areas without impacts (roads/ways) by man.

Response: During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input that has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and, at that time, will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Volume I, Chapter 2 of this EIS.

7. *Comment:* The oil and gas (mineral) potential of the WSA is ranked moderate by SAI (1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be moderate to high. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (33,690 acres); and (3) Partial Wilderness (27,960 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

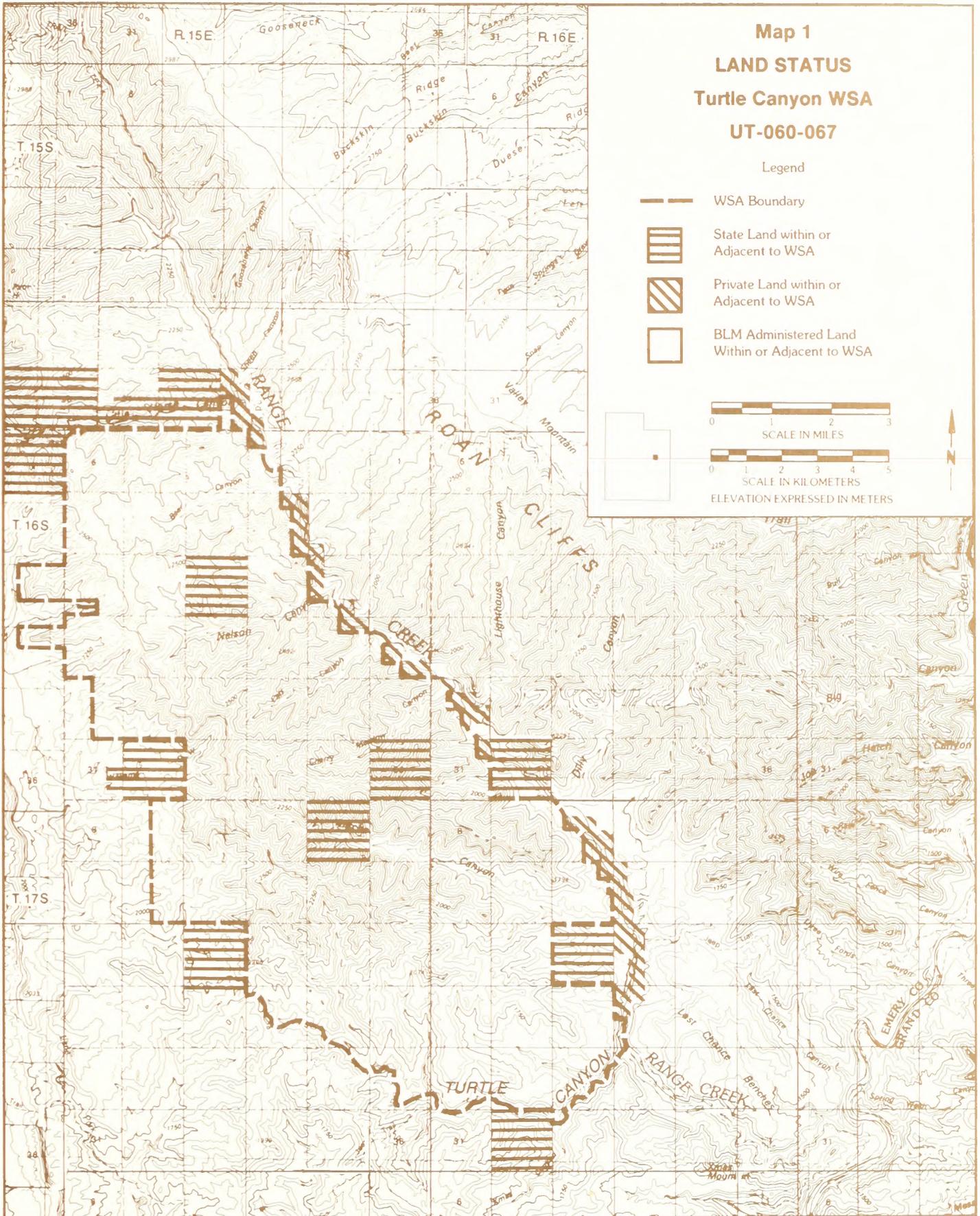
NO ACTION ALTERNATIVE

Under this alternative, none of the 33,690-acre Turtle Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Price River Resource Area Management Framework Plan (MFP) (USDI, BLM, 1983). The State and private lands within or adjacent to the WSA (refer to Map 1) have not been identified for special Federal acquisition through exchange or purchase; therefore, these lands are analyzed in this alternative as remaining under existing State and private ownership.

The following are specific actions that would take place under this alternative:

- All 33,690 acres would remain open to mineral leasing and sale. Due to an oil shale withdrawal in the northwest corner of the WSA, 3,717 acres would remain closed to mineral location, while the remaining 29,973 acres would remain open. Although

TURTLE CANYON WSA



TURTLE CANYON WSA

no mining claims now exist, development work, extraction, and patenting would be allowed on any future valid mining claims. Development would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809). Existing and future oil and gas leases could be developed under leasing Category 2 (standard and special stipulations) in the entire WSA without concern for wilderness values. The special stipulations are designed to minimize impacts to watershed and deer winter range. Seven hundred forty acres in the WSA are under lease for coal and could be developed. Future leases for coal could be considered, although the potential appears low.

- The present level of domestic livestock grazing use of the 33,690-acre WSA would continue as authorized in the MFP (169 Animal Unit Months [AUMs]). Although none now exist, new range developments could be implemented without wilderness considerations. Vegetation treatments (chaining or burning and seeding) in two locations (99 total acres) would be allowed as proposed in the MFP.
- Developments for wildlife, watershed, water resources, etc. (except for one small pond, none presently exist and none are currently planned) would be allowed without concern for wilderness values if in conformance with the MFP. Future introduction of bighorn sheep or elk could be allowed if proposed by the Utah Division of Wildlife Resources (UDWR).
- The 33,690 acres, including about 8 miles of ways and abandoned jeep trails, would remain open for vehicular use. Current off-road vehicle (ORV) use is essentially non-existent due to steep terrain conditions. New access roads in the WSA could be developed without wilderness considerations.
- The entire 33,690-acre area would continue to be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned primarily due to terrain limitations.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II (33,690 acres).
- Measures to control fire, insects, noxious

weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.

- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or, on a case-by-case basis, to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.
- Under this alternative, it would be possible to designate an Outstanding Natural Area (ONA) covering about 27,000 acres (similar to the area described for the Partial Wilderness Alternative). Consideration of an ONA would be independent of wilderness values and could be implemented through the normal BLM land use planning process; therefore, it is not discussed further in this wilderness document.

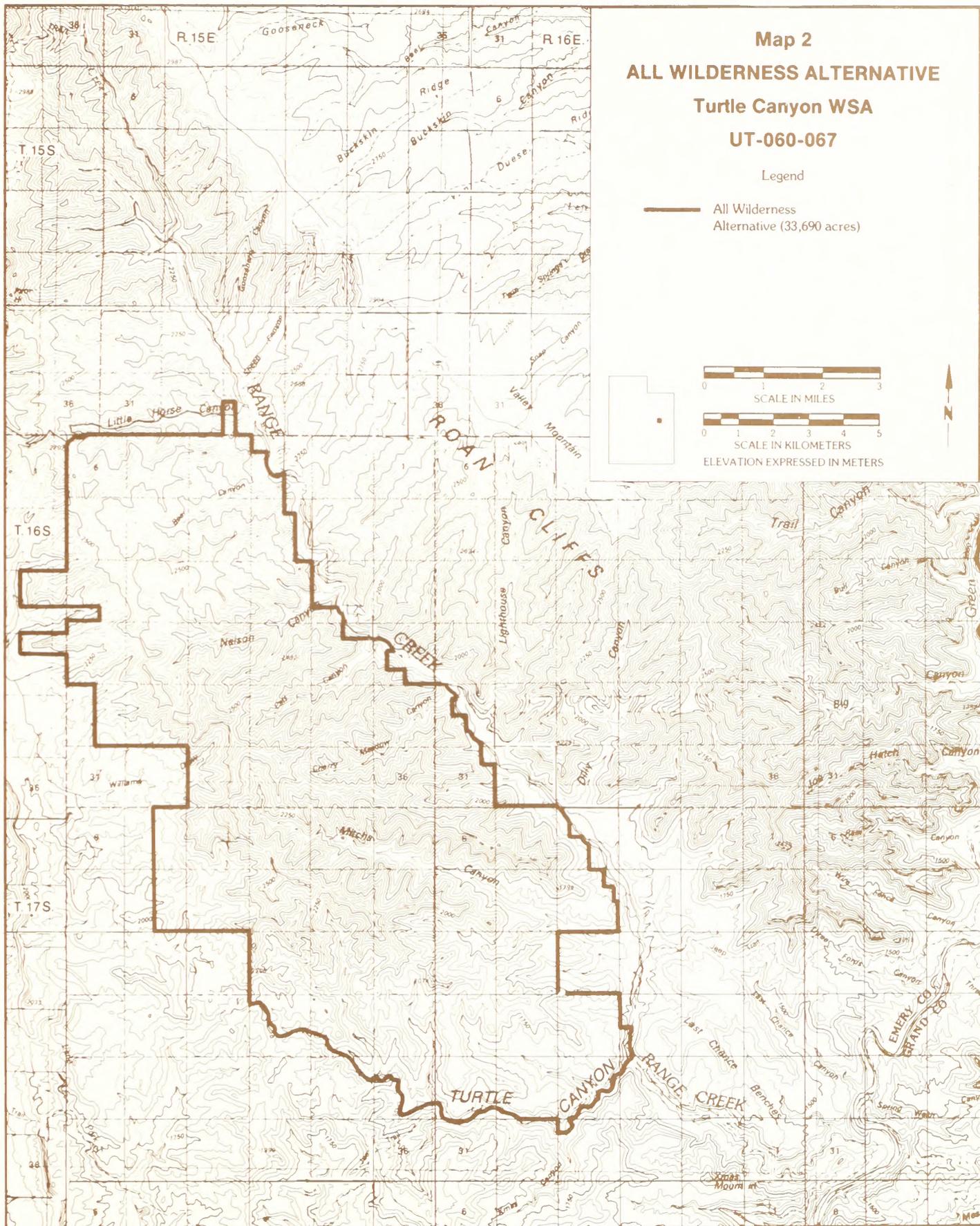
ALL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, all 33,690 acres of the Turtle Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. On designation, acquisition of three sections (1,928.64 acres) of State land within the WSA (refer to Map 1) is likely. (Refer to Volume I for further information regarding State in-holdings.) The State has also identified three and one-eighth sections adjacent to the WSA for possible exchange. Private land and the remaining State sections adjacent to the WSA likely would not be acquired or exchanged. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located within the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 33,690 acres would be withdrawn from mineral

TURTLE CANYON WSA



Map 2

ALL WILDERNESS ALTERNATIVE

Turtle Canyon WSA

UT-060-067

Legend

— All Wilderness Alternative (33,690 acres)



SCALE IN MILES



SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS

TURTLE CANYON WSA

location and closed to new mineral leasing and sale. Although no mining claims now exist, development work, extraction, and patenting would be allowed to continue on any valid mining claims that may be located prior to wilderness designation. It is assumed that such claims would not be located. Any mining development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with concern for wilderness values. Existing oil and gas leases involving the 18,931 acres would be phased out upon expiration unless a find of oil or gas resources in commercial quantities is shown. Unitized leases involving approximately 9,107 acres would continue to be held. No new oil and gas leases would be issued. Development of the existing coal leases would also occur, although it is unlikely that surface facilities would be located in the WSA.

- Present domestic livestock grazing would be allowed to continue as authorized in the Price River MFP. The 169 AUMs in the WSA would remain available to livestock as presently allotted. After designation, new range developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that wilderness protection standards are met (refer to Appendix 1). The proposed 99 acres of vegetation treatments would not be allowed.
- New water resource facilities or watershed activities not related to range or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). No water resource facilities or treatments are presently planned.
- Wildlife transplants and developments (none now exist or are proposed) would be allowed as long as criteria (refer to Appendix 1) are met to adequately protect wilderness values. Future reintroduction of big-horn sheep or elk could be allowed if proposed by UDWR.
- The entire 33,690-acre area would be closed to ORV use except for users with

valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 8 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 13 miles of the WSA boundary follow existing gravel and dirt roads in Little Horse, Range Creek, and Turtle Canyons, and these would remain open to vehicular travel.

- A specific Wilderness Management Plan would be developed to govern use and protection of the 33,690-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed for roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 33,690 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 33,690-acre area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the 33,690-acre wilderness area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent

TURTLE CANYON WSA

structures unless no other feasible alternatives exist.

- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species, or on a case-by-case basis, to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while, at the same time, presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon showing that removal of the offending predators would not diminish the wilderness values of the area.

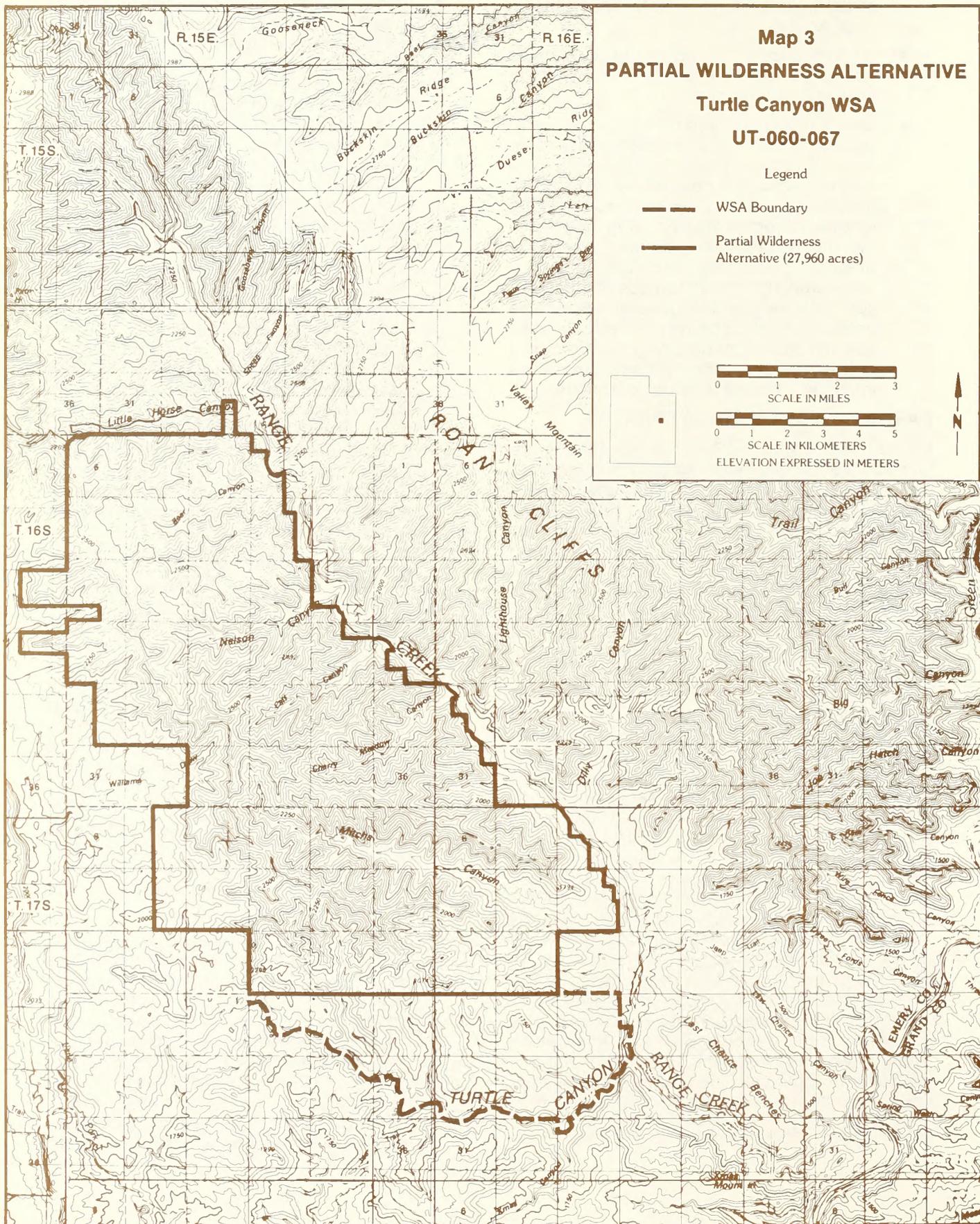
PARTIAL WILDERNESS ALTERNATIVE

Under this alternative, 27,960 acres of the Turtle Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to (1) analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics; (2) protect watersheds and soils most sensitive to surface disturbance; and (3) minimize conflict with potential mineral (oil and gas) development. The acres analyzed as wilderness under this alternative include the steepest and most mountainous portion of the WSA. The 5,730-acre area south of a major east-west cliffline, within the WSA but outside of that portion designated as wilderness, would be managed in accordance with the Price River MFP, as described for the No Action Alternative. The 27,960-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative. Three sections (1,928.64 acres) of State land within the WSA are likely to be exchanged. The State has also identified three and one-eighth sections adjacent to the WSA for possible exchange. Private land and the remaining State land adjacent to the land designated as wilderness for this alternative likely would not be acquired or exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. (Refer to Volume I for further information regarding State in-holdings.) The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 27,960-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. In the 27,960-acre area, development work, extraction, and patenting would be allowed to continue on any valid claims located prior to wilderness designation (there are none at the present time). Existing oil and gas leases covering 18,931 acres in this part of the WSA would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. Unitized leases involving approximately 9,107 acres would continue to be held. Existing coal leases in the designated area could be developed through underground mining methods. The 5,730-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of future mining claims could occur in this area without wilderness consideration if claims are valid. The area not designated would be managed as oil and gas leasing Category 2 (standard and special stipulations). Future coal leasing could be considered in the nondesignated area.
- Domestic livestock grazing would continue to occur in the 27,960-acre wilderness area. The 152 AUMs in the 27,960-acre area would remain available to livestock as presently allotted. Proposed vegetation treatments on 99 acres (13 AUMs) in the wilderness area would not be allowed. Other new range developments (none are currently planned) could be allowed if necessary for protection and management of the range and/or wilderness resource. In the 5,730-acre nonwilderness area, grazing use of 17 AUMs would remain available for livestock as presently allotted. New range developments (none are currently planned) could be allowed in this area without concern for wilderness values.
- In the 27,960-acre wilderness, new water resource facilities or watershed activities not related to range or wildlife management would be allowed only if enhancing to wilderness, if necessary to correct conditions imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the remaining 5,730-acre area, water resource facility developments would be allowed without concern

TURTLE CANYON WSA



TURTLE CANYON WSA

for wilderness values if in accordance with the MFP. None are now proposed.

- In the 27,960-acre wilderness, wildlife transplants or habitat improvements would be allowed only if compatible with wilderness values. In the remaining 5,730-acre area, wildlife transplants or improvements would be allowed without concern for wilderness values. None are now proposed in either the designated or undesignated portion of the WSA.
- The mountains, cliffs, and canyons that would comprise the 27,960-acre wilderness would be closed to ORV use. About 0.5 mile of existing ways (vehicle tracks) in Cherry Meadow, Calf, and Nelson Canyons would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the unit, including the existing 7.5 miles of abandoned jeep roads in the southeast part of the WSA, as well as the roads bordering the WSA in Range Creek and Turtle Canyons, would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 27,960-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the wilderness portion of the WSA would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 5,730 acres would be open to commercial woodland harvest, although none is planned.
- Visual resources on the 27,960-acre wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The remaining 5,730 acres would be managed as VRM Class II.
- Within the 27,960-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, prop-

erty, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques. In the 5,730-acre nonwilderness area, measures of control would be taken without wilderness considerations.

- In the 5,730-acre nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 27,960-acre wilderness, such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the nondesignated area, hunting would be allowed subject to applicable State and Federal laws and regulations. In the 27,960-acre wilderness, hunting would be allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means.
- In the 5,730-acre area, wilderness considerations would not affect the methods allowed to control predators for protection of threatened or endangered wildlife species or, on a case-by-case basis, to prevent special and serious loss of domestic livestock. In the 27,960-acre wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alterna-

TURTLE CANYON WSA

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
TURTLE CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (33,690 Acres) (Proposed Action)	Partial Wilderness Designation (27,960 Acres)
Geology	An undetermined amount of subsidence and possible surface fracturing could result from coal mining.	Effects could be the same as for the No Action Alternative.	Effects could be the same as for the No Action Alternative.
Soils	Annual soil loss in the WSA could increase by up to 12 percent due to mineral-related activities.	Annual soil loss in the WSA could increase by up to 1.4 percent due to mineral-related activities.	Annual soil loss in the WSA could increase by up to 2.7 percent due to mineral-related activities.
Water Resources	Mining could disrupt ground water supplies, possibly affecting water quality and spring discharge.	Effects could be the same as for the All Wilderness Alternative.	Effects could be the same as for the All Wilderness Alternative.
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 to 15 million barrels of oil, 18 to 90 billion cubic feet of natural gas, 27 million tons of coal, and 500 tons of uranium oxide.	Oil and gas likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these minerals, however, the loss of development opportunity would not be significant. Up to 27 million tons of coal could be recovered.	Although likelihood is low, up to 2.5 to 13 million barrels of oil, 3 to 15 billion cubic feet of natural gas, and 27 million tons of coal could be recovered. Assuming a worst-case analysis, uranium oxide may not be recovered.
Wildlife	About 1 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude. Elk and Rocky Mountain bighorn sheep numbers could increase.	Wildlife in the designated area would benefit from solitude. Almost 1 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 169 AUMs would continue. There are no existing developments. A proposed 99-acre land treatment could be implemented.	Grazing of 169 AUMs would continue. Little effect on grazing management is expected. Proposed new developments might not be allowed.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 459 acres.	Visual quality could be impaired on up to 60 acres.	Visual quality could be impaired on 113 acres, including 60 acres in the designated portion. All of the Class A scenery would be protected by the reduced potential for disturbance.
Recreation	ORV use could continue on 8 miles of ways. Overall recreational use could increase from the present 500 visitor days per year to 745 over the next 20 years. Up to 360 acres of mineral-related disturbance and 99 acres of land treatment could reduce the quality of primitive recreation.	The WSA, including 8 miles of ways, would be closed to ORV use. Primitive recreational use could increase. Recreational use could increase to up to 3,369 visitor days over the next 20 years due to publicity associated with wilderness designation.	ORV recreational use could continue on 7.5 miles of ways in the undesignated portion. Overall recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.

TURTLE CANYON WSA

TABLE 1 (CONTINUED) SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES TURTLE CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (33,690 Acres) (Proposed Action)	Partial Wilderness Designation (27,960 Acres)
Wilderness Values	Wilderness values could be lost on up to 459 acres (1.4 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 60 acres (less than 0.2 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on up to 60 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on less than 1 percent of the 5,730 acres not designated. Overall, wilderness values could be lost on 0.3 percent of the WSA. However, about 82 percent of the area meeting the standards for outstanding opportunities for solitude and primitive recreation and the standard for naturalness would be in the designated portion and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Emery County Zoning Plan</i> , State of Utah plans and policies, and the current BLM Price River MFP.	This alternative would not be consistent with Emery County zoning. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM Price River MFP.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Emery County zoning.
Socio-economics	Annual local sales of less than \$5,340 and Federal revenues of up to \$86,571 would continue. An additional \$21,816 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$5,340 and Federal revenues of up to \$237 would continue, but Federal revenues of up to \$101,070 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by an undetermined amount.

TURTLE CANYON WSA

tives are listed in the table to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the Price River Unit Resource Analysis (USDI, BLM, 1982c) and other BLM technical reports and documents.

Air Quality

The WSA is in a Prevention of Significant Deterioration (PSD) Class II air quality area under the 1977 Clean Air Act Amendments. The nearest Class I area is Arches National Park, 40 miles south. Other nearby Class I areas include Canyonlands National Park (66 miles to the south) and the Colorado portion of Dinosaur National Monument (96 miles to the northeast). Potential pollution sources include industrial and vehicular emissions from Castle Valley, the Green River-Moab area, the Uinta Basin, and the Wasatch Front. Other local or point sources include powerplants in Castle Valley, U.S. Highway 6-50, and uranium processing in Moab. Intermittent, localized fugitive dust is the most significant air pollutant in the WSA at this time. Visibility remains good, ranging from 30 to 100 miles from promontories.

Geology

The WSA is in the Uinta Basin Section of the Colorado Plateau Physiographic Province. The WSA is positioned on a large monocline dipped downward between the uplifted San Rafael Swell and the Uinta Basin, downwarped at an angle of about 5 degrees. Sedimentary rocks (strata), exposed at the surface, range in age from the Cretaceous period (130 million years ago) to the Tertiary (25 million years ago). The exposures represent approximately 4,500 feet of sedimentary strata between the lower Parachute Creek Member of the Green River Formation and the Price River Formation.

The topographic features of the WSA are a result of (1) its position between the San Rafael Swell and the Uinta Basin; (2) gradual uplift of the Colorado Plateau; and (3) 40 to 50 million years of erosion. The result has been the formation of one principal, sharp, rocky, irregular ridge extending northwest to southeast nearly the length of the WSA and forming a major divide between Little Park/Turtle Canyon and Range Creek. To the

southwest short canyons cut to the face of the ridge, which rises abruptly. To the northeast, five major drainages are incised between the principal ridge and Range Creek, dropping steadily or, in places, abruptly, an average of 3,000 feet of elevation over a distance of 3 to 8 miles. Each of the drainages forks at least once between Range Creek and the principal ridge. Each of these canyons and canyon forks is separated by a ridge similar to the principal ridge. The canyons have been incised across strata resistant to erosion resulting in steep, narrow, V-shaped canyons.

The principal ridge terminates on the south in a formidable line of east-west cliffs formed from the lower red unit of the Wasatch Formation. Slopes in the WSA north of this cliff range from 40 to in excess of 100 percent, forming canyons from 1,000 to 3,000 feet in depth. Flat areas are limited to drainage bottoms, ledges, and short narrow stretches on ridge tops. Formations exposed at the surface north of the cliffs are the Green River and Wasatch, primarily Wasatch. The thin-bedded brown, buff, red, and gray sandstones are interbedded with red, maroon, and green shales. Balanced rocks, pinnacles, and spires have been blocked out by joints in the more massive Wasatch Sandstone layers. Other features known to exist near the WSA in these same strata include caves and arches, although none are yet known in the WSA.

Topography south of the east-west cliffline changes dramatically with the change in formations exposed at the surface. A thin layer of Flagstaff Limestone marks a transition of topographic and color contrast to the primarily buff and gray sandstones and shales of the North Horn, Tuscher, Farrer, and Price River Formations. Here massive resistant beds alternate with less resistant beds to form a landscape of benches and talus slopes cut by fan-like canyons. The canyons alternate between more open stretches and steep-walled, 100- to 500-foot deep canyons with changes in resistance to erosion as the drainages rise to the Wasatch cliffline. These canyons are mainly the 4- to 5-mile tributary drainages to Turtle Canyon and the lower reaches of Mitches Canyon. Surface features of visual interest include vertical cliffs, honeycomb surfaces, sandstone hills, and remnants of reddish-black iron concretions.

Elevations range from 9,342 feet atop a peak south of Little Horse Canyon to 4,800 feet in Turtle Canyon. Most of the more massive, vertical rock outcrops presented at the surface tend to be southwest or south of the WSA's major ridge.

TURTLE CANYON WSA

Outcrops northeast of the ridge are in monoliths, walls, buttresses, pinnacles, and other remnants projecting out from, or separating, very steep forested slopes.

Soils

About 80 percent of the soil types in the WSA reflect steep to very steep slopes. Presently most of these soils are retained or protected from excessive erosion by extremely gravelly, stony surfaces or dense vegetation cover. About 21 percent of the WSA is rock outcrop, 26 percent upland shallow loam, and 32 percent is a mountain loam soil dominated either by Douglas fir or mountain shrub vegetation. These steep soils are highly susceptible to erosion when disturbed. Natural erosion is about 1.0 cubic yard/acre/year. Soil losses along roads constructed across these slopes are considerably more, particularly where underlain by shale or interbedded sandstone and shale.

Soils in those drainage bottoms north of the major east-west cliff are deep upland stony loams reflecting flatter slopes and riparian environments. Shallow shales are found in the major Turtle Canyon drainages southwest of the WSA. Semidesert, very shallow loams cover the benches and drainages in the southeastern part of the WSA.

An average soil erosion rate for disturbed soils in the WSA is estimated to be 9.0 cubic yards/acre/year. This assumes surface-disturbing activity would impact soil groups in proportion to the percentage of the WSA in which they are present (a weighted average). It assumes no impacts to rock outcrop areas. Present natural erosion averages 1.0 cubic yard/acre/year.

Table 2 describes soil characteristics and land types, and Table 3 describes erosion conditions for the WSA.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Shallow to very deep stony soils on steep mountainsides	80	26,952	1	10
Shallow loamy soils on sloping ridges and structural benches	20	6,738	1	5
Totals				

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions		Annual Soil Loss If Disturbed	
		Percent of Area	Cubic Acres	Percent of Area	Cubic Acres
Very High	20				
High	10			80	26,952
Medium	5			20	6,738
Low	1	100	33,690		
Very Low	0.1				
None	0				
Totals			33,690 ¹		33,690

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 1.0 under present conditions; 9.0 if disturbed.

Expected revegetation success in 80 percent (26,952 acres) of the WSA is poor to very poor. In areas where slope is less severe (20 percent or 6,738 acres), reclamation potential is fair to poor. Slope, soil depth, and aspect are all major limiting factors affecting reclamation success.

Vegetation

Existing vegetation types in the WSA are summarized in Table 4. Types are listed by dominant species and approximate acreage and percentage of the WSA. Thirty-eight percent of the WSA is currently in a pinyon-juniper vegetation type, dominated by juniper, and 7 percent is pinyon-juniper-Douglas fir type. Nearly a third of the WSA is in Douglas fir or mountain shrub dominated types. The remainder are riparian types or rock outcrop.

The pinyon-juniper type occurs on dryer slopes and overall cover ranges from 18 to 26 percent. Tree cover (Utah juniper and pinyon pine) dominates the type. Common understory plants include large shrubs such as birchleaf mountain

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper (shallow loams)	12,900	35
Douglas fir (mountain loams)	7,310	22
Rock outcrop	7,190	21
Mountain shrub (mountain loams)	3,430	10
Pinyon-juniper-Douglas fir (shallow shales)	2,130	7
Big sagebrush (drainages)	410	1
Salina wildrye (drainages)	320	1

Source: USDI, BLM, 1982c.

TURTLE CANYON WSA

mahogany and cliffrose, while green Mormon tea, wheatgrass, Salina wildrye, bullgrass, and Indian ricegrass are also common.

The Douglas fir type is very productive with cover ranging from 32 to 46 percent. Douglas fir dominates the type. Associated trees include Utah juniper and pinyon pine. Understory includes the large shrubs of curlleaf mountain mahogany and squawbush. Other common plants include Indian ricegrass, bluegrass, squirreltail, penstemon, locoweed, and spurge.

On rock outcrop, vegetation cover is low, ranging from 0 to 24 percent. Juniper and pinyon trees are scattered among the rocks, along with understory species, such as Utah serviceberry, cliffrose, snowberry, bullgrass, galleta, gilia, and hood phlox.

Vegetation cover in the mountain shrub type ranges from 19 to 46 percent with the dominant shrubs being littleleaf mountain mahogany and big sagebrush. In this productive type, other common shrubs and trees include snowberry, Utah juniper, pinyon pine, Douglas fir, and aspen. Bluegrass, wheatgrasses, western harrow, lupine, and Indian paintbrush are also common.

The pinyon-juniper-Douglas fir type occurs on gentle slopes and cover ranges from 20 to 33 percent. This type is found in the drainages of Turtle Canyon in the southwest corner of the WSA. Common understory plants include Utah serviceberry, cliffrose, green Mormon tea, squawbush, snowberry, bullgrass, and phlox.

Two riparian vegetation types are found in the WSA. Salina wildrye dominates in Mitches Canyon and the head of Turtle Canyon. Other common plants including bullgrass, galleta, Utah juniper, pinyon pine, serviceberry, Mormon tea, birchleaf mountain mahogany, rabbitbrush and hymenoxys, combined with Salina wildrye, to average a total cover of 35 percent. The sagebrush type averages a 41-percent cover including cottonwood, serviceberry, single leaf ash, snowberry, currant, squawbush, woods rose, and rabbitbrush. A diversity of grasses and some sedges are also present. The sagebrush type dominates about 6 miles of stream bottom along Range Creek and in Bear, Nelson, Calf, and Cherry Meadow Canyons.

The Turtle Canyon WSA lies in the Colorado Plateau Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type of the WSA is pinyon-juniper. PNV is the

vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

No threatened or endangered species have been located within the WSA. *Gailardia flava*, a candidate species for listing as threatened or endangered by the Fish and Wildlife Service (FWS), has been located immediately outside the WSA, and habitat is present in about 6,700 acres of the WSA. It is recommended as threatened (Welsh, 1979) with principal threats being development, ORV use, and general recreation. Habitat in the WSA consists of areas on alluvial fans and terraces, between 4,200- and 5,400-foot elevations where cottonwood-willow communities are present. Other candidate species that may be present in the WSA include *Hedysarum occidentale* var. *canone* and *Psoralthamnus polyadenius* var. *jonesii*.

Water Resources

The major water source in the area is Range Creek, which (with the exception of about 1 mile) flows outside the WSA along its northeastern edge. Ten springs are found in all of the major tributaries to Range Creek and in the head of one of the forks of Turtle Canyon and a fork of Little Park Wash. These springs may keep flows in the channels for about 1 mile, or may flow in segments alternately reaching the surface and going underground. Mitches Canyon, where water flows for several miles, is an exception. A total of about 10 miles of stream is present, almost all of which is in the northern 80 percent of the WSA. Basin geology, drainage area, and lack of upstream use result in relatively good water quality. Water is probably safe for human consumption and contact without treatment. Nevertheless, precautions are desirable since water quality data are lacking. The extent or quality of the ground water resource in the WSA is largely unknown. It is known that aquifers are present that feed the springs in the WSA.

One small pond is the only known developed water source. It is located along an abandoned way in the southeast part of the WSA.

Mineral and Energy Resources

Each WSA was assessed for its energy and mineral resources by SAI (1982). Table 5 summarizes

TABLE 5
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f3	c3	Less than 10 to 50 million barrels of oil; less than 60 to 300 billion cubic feet of gas
Uranium	f2	c1	Less than 500 tons
Coal	f4	c3	55 million tons
Geothermal	f1	c3	None
Hydroelectric	f1	c4	None
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

the energy and mineral resources in the WSA. (Refer to Appendix 5 for a detailed description of the SAI rating system.)

An overall importance rating (OIR) of 3 was assigned to the Turtle Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian

needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA. The WSA could contain deposits of uranium that are currently listed as strategic and critical materials (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

The favorability rating assigned for oil and gas in the WSA is based on the presence of fields in the general area, petroleum shows in exploration wells near the WSA, and the presence of tar sand and oil shale deposits north of the WSA. The f3 rating indicates 10 to 50 million barrels of in-place oil or 60 to 300 billion cubic feet of in-place natural gas. About 3 to 15 million barrels of oil and 18 to 90 billion cubic feet of natural gas would be considered recoverable. The c3 rating indicates a moderate level of certainty concerning the favorability rating. The WSA includes approximately 120 acres of the Trail Canyon Known Geologic Structure (KGS).

Producible oil and gas are found only where an adequate petroleum source, porous and permeable rock, and a trap to hold the petroleum occur. Petroleum is evidenced in the vicinity of the WSA by shows of petroleum, primarily gas, found in abandoned wells. No producing wells have been drilled, and it is unknown whether adequate reservoirs for production are present within the WSA. To date, all wells drilled in the vicinity have been dry except one which tested at 2.7 million cubic feet per day. The well was plugged back to the Cedar Mountain Formation and has been shut-in by the company pending decisions regarding future exploration and development. It is expected to be producible if economics and/or additional discoveries justify placement of production facilities. The structural and stratigraphic conditions that trapped the gas are not known at this time.

Porous rocks known to be favorable for oil and gas production in the region are present within the WSA. Oil and gas potential within the WSA for the Green River and Wasatch Formations, found in the Peters Point Field about 15 miles north, is low. In the WSA, these formations are highly dissected and exposed to the surface with oil shale and tar sand-bearing strata being absent. Structural and stratigraphic conditions under which production occurs in Peters Point Field are also absent. Formations that produce elsewhere are

TURTLE CANYON WSA

present below the surface of the WSA. The Moenkopi produces oil in the Grassy Trail Field (about 15 miles west of the WSA), from multiple small traps caused by minor faulting, the upward dip of the formation toward the south, and the low porosity in parts of the formation. The Farnham Dome Gas Field, about 20 miles northwest, produces gas from a small closed structure (a dome) in Navajo Sandstone. Small amounts of carbon dioxide and helium gases were also produced in the 1920s from a closed structure in the Navajo Sandstone of the Woodside Field 7 miles southwest of the WSA. The San Arroyo Field, the nearest moderately large field, is about 60 miles to the east and produces from small closed structures (traps) in Entrada Sandstone and from a combination of structural and stratigraphic conditions in Dakota Sandstone. Other formations of interest producing in the region include the Morrison and Cedar Mountain. The Moenkopi, Navajo, Dakota, Cedar Mountain, Morrison, and Entrada Formations are present at 2,600 to 7,200 feet below the surface in the WSA.

No large structural features are known to occur in those rocks favorable for production identified above. The rocks lie over the top of the Uncompahgre Uplift, which is deeper. About 4 to 5 miles of the 100- to 200-mile uplift may be under the WSA. Recent drill hole data around the WSA suggest that the uplift tapers off at the south of the WSA or is discontinuous under the WSA. Small structural or stratigraphic features with adequate reservoir capacity could be present and may have some relationship to possible movement along the Uncompahgre Uplift. Some potential for traps may also exist very deep (15,000 to 20,000 feet down) in Paleozoic rocks of the WSA if the Uncompahgre is a thrust fault with traps underneath and along the fault zone. A drill hole 40 miles east of the WSA suggests this possibility. A possibility for traps in buried rubble along the south of the uplift also exists.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and

development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Approximately 83 percent of the WSA (28,038 acres) is now under lease for oil and gas. Under present leasing categories, the entire WSA is open to leasing with standard and special stipulations (Category 2) for watershed and critical deer winter range protection. The oil and gas leasing categories were revised in 1983 to 1984.

No leases are under production or held by established production within the WSA; however, a portion of one unit of pre-FLPMA and post-FLPMA leases (approximately 9,107 acres) does fall within the WSA. An oil and gas unit is formed from leases grouped together in a block for exploration and/or production purposes. The unit is currently holding leases past their expiration dates. The well drilled to establish the unit in 1981 was plugged and abandoned in 1982 and re-entered in 1983. A second well was drilled within the unit about 5 miles outside the WSA in 1984. If no further exploration occurs, the unit and leases will expire or be reduced to a participating area around wells drilled in 1981 and 1984. Leases issued as of October 1984 are depicted in Table 6.

TABLE 6
Oil and Gas Leases

Type	Acres of WSA	Percent of WSA
Pre-FLPMA	7,730	23
Post-FLPMA	20,308	60
Not Leased	5,652	17

Source: USDI, BLM, 1982c.

Coal

The favorability rating for coal (f4) reflects the presence of coal recoverable in large tonnages under approximately 7 percent of the WSA. The certainty rating of c3 is based on production data

TURTLE CANYON WSA

from nearby mines and existing available data on coal-bearing formations present under the WSA.

Coal is known to be present and recoverable from the Blackhawk Formation under approximately 2,360 acres of the WSA. The coal beds are thicker than 4 feet and less than 3,000 feet below the surface in this area. The area extends up to 1 mile inside the WSA boundary and is estimated to contain 55 million tons of in-place coal, of which 27 million tons could be recovered. The mining method employed would be underground, and no surface facilities are likely to be needed or located within the WSA. Of the area underlain by recoverable coal within the WSA, 740 acres are under lease for coal.

LOCATABLE MINERALS

There are no mining claims in the WSA nor any known or suspected occurrences of locatable minerals. In the northwest corner of the WSA, a 3,717-acre area is closed to mining claim location by an oil shale withdrawal.

Uranium

The f2 rating for uranium indicates a potential for less than 500 tons of uranium oxide. The certainty rating (c1) reflects the lack of surface occurrences, mines, or known deposits. The WSA is well outside of any generally recognized uranium resource area.

Formations known to be favorable for uranium range in approximate depths of 5,000 to 12,000 feet below the surface. Uranium from these formations is not considered recoverable.

SALABLE MINERALS

Salable minerals present, such as sand and gravel, are of little or no value considering their remote location in the WSA and common occurrence elsewhere.

Wildlife

A wide variety of wildlife inhabits the WSA. Springs and intermittent and perennial streams; variety in vegetation, including highly productive mountain and riparian types; rugged terrain, including clifflines; and the extreme variation in elevation all contribute to a diversity of wildlife. Only the more common or distinctive species are discussed here. Major species of interest include Rocky Mountain bighorn sheep, mule deer, elk, mountain lion, black bear, blue grouse, ruffed grouse, golden eagle, and prairie falcon.

Twenty-two Rocky Mountain bighorn sheep were

reintroduced in 1970 and 1973 on the Uintah and Ouray Indian Reservation at the mouth of Florence Creek about 6 miles east of the WSA. They are reoccupying historical range in and around Desolation Canyon, including the majority of the WSA. One sighting was made on the rim of Turtle Canyon in 1973 as well as additional sightings near the Green River in 1976. Within the WSA, 10,370 acres are bighorn sheep habitat, representing about 8 percent of the total range identified for the Range Creek herd. No fawning areas for the herd have been identified at this time. Present population within the WSA is estimated at three animals, while the prior stable population is 71.

Mule deer winter, critical winter, and summer range for Herd Unit 27B all occur in the WSA. Winter range for the herd unit is not considered a limiting factor for herd viability at this time. The WSA includes 8,455 acres of critical winter range, representing 7 percent of the total critical winter range for the herd. Present winter population in the WSA is estimated at 138 animals, while carrying capacity is 423. The WSA includes 9,910 acres of summer range, representing about 4 percent of the total summer range for the herd. Present summer population in the WSA is about 155 animals, while carrying capacity is 367. Herd concentrations frequently occur along Range Creek and Mitches Canyon, particularly in the winter.

Elk disappeared from the Range Creek herd along with adjacent Avintaquin and Manti herds in the early 1900s. The Avintaquin and Manti herds were reestablished by transplant, and the Range Creek herd is being reestablished by movement from adjacent herds. The WSA includes 32,705 acres of elk winter range, representing about 10 percent of the total winter range for the herd. The WSA is presently used for winter range by seven elk, although carrying capacity is 112. The WSA also includes 985 acres of elk summer range, representing about 1 percent of the total summer range identified for the herd. No summer use of the WSA is presently believed to occur, although the WSA could support 10 elk during the summer.

Mountain lion and black bear are both common to the WSA and populations are considered healthy. Mountain lion rely heavily on mule deer for food.

Blue grouse, ruffed grouse, and chukar partridge are the major upland game birds present. Year-long habitat for blue and ruffed grouse is found from Mitches Canyon north, and chukar habitat occurs mainly in Turtle Canyon, lower Mitches Canyon, and Range Creek. Chukar partridge, an exotic species, was introduced in 1951 and 1956

TURTLE CANYON WSA

and is common in the vicinity. Critical habitat for these species does not occur within the WSA.

Species of nesting raptors occurring or potentially occurring throughout the WSA are golden eagle (a BLM sensitive species), prairie falcon, Cooper's hawk, goshawk, American kestrel, red-tail hawk, and ferruginous hawk (candidate species listed as threatened or endangered). The bald eagle (endangered) is also thought to use the vicinity of the WSA during winter migration, and the endangered peregrine falcon may also use the area. One raptor nest is known to occur in the WSA; however, no intensive raptor survey has been completed in the WSA.

Other common wildlife present include cottontail rabbit, bobcat, coyote, ringtail cat, grey fox, a variety of rodents, and some reptiles such as the side-blotched lizard and the midget faded rattlesnake. Common birds include the migratory mourning dove and large numbers of perching species, including the violet green swallow, white throated swift, and pinyon jay.

Fish, including cutthroat and brown trout, are present in Range Creek although the WSA includes only a very short segment of the creek, which is of lower fish habitat quality (due to increased temperatures) than segments found further upstream.

No threatened or endangered wildlife species were identified by FWS in the WSA. However, the WSA is believed to be used by the endangered peregrine falcon and bald eagle (winter). Six sightings of peregrine falcon have occurred in the general vicinity of the WSA, with four of these being within the adjacent Desolation Canyon WSA. About 9,070 acres of habitat were delineated for the WSA, based on general topography and suitable cliff nesting habitat within 0.5 to 1 mile of live water. Nine bald eagles were identified along the Green River in the first bald eagle count completed for the Desolation Canyon area in January 1984. In addition, candidate species for possible listing as threatened or endangered that may use the area include the ferruginous hawk, Western snowy plover, white-faced ibis, and long-billed curlew.

No projects have been identified or proposed for wildlife in the WSA.

Forest Resources

Adequate volumes for timber harvest are present in most of the tree-dominated vegetation types identified within the Vegetation section. Limited

amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees could be produced. However, slopes are prohibitive to production in most of the WSA, accessibility is very poor, and distance to mills is not favorable. More suitable stands are available elsewhere, and there is no commercial or noncommercial interest in forest products within the WSA. The forested area is considered nonproductive and noncommercial. No production of forest products has occurred in the past.

Livestock and Wild Horses/Burros

The WSA contains portions of four grazing allotments. Table 7 summarizes livestock grazing use data, and Table 8 summarizes allotment acreages and AUMs within the WSA.

TABLE 7
Livestock Grazing Use Data

Allotment	Total Acres	Active AUMs	Type of Livestock	Season of Use	Number of Operators
Range Creek	54,888	300	Cattle	6/1-6/15 10/1-10/15	1
Little Park	23,393	242	Cattle Horses	5/25-10/10	4
Last Chance	44,793	1,050	Sheep	11/1-4/30	2
Patmos	7,878	47	Cattle	6/1-10/25	1

Source: USDI, BLM, 1982c.

There are no range developments in the WSA. Rough terrain and limited access have confined livestock use to drainage bottoms, primarily the more open bottoms close to Range Creek. Some utilization of pinyon-juniper and shrub types has occurred on the gentler slopes in the south portion of the WSA. No use of the Last Chance Allotment by the permittee has occurred since 1975. Two vegetation treatment projects have been proposed in the WSA (refer to Table 9).

The above projects were identified based on biological suitability to increase livestock forage. A preliminary check for economic and technical feasibility, cost/effectiveness, and consistency with BLM range policy criteria has not been completed. The projects are mainly located in the southern 20 percent of the WSA, where Utah juniper and pinyon pine are dominant species. Small tracts of potentially arable land overlap the WSA at canyon bottoms along Range Creek. However, the large majority of and higher quality arable or potentially arable land along Range Creek is privately owned or outside the WSA.

Wild horses or burros are not known to occupy the WSA.

TURTLE CANYON WSA

TABLE 8
Allotment Acreages and Available AUMs in WSA

Allotment	Total Acres	Acres in WSA	Percent in WSA	Total AUMs	AUMs in WSA	Percent in WSA
Range Creek	54,888	19,660	36	300	143	48
Little Park	23,393	6,000	26	242	3	1
Last Chance	44,793	8,000	18	1,050	22	2
Patmos	7,878	30	Less than 1	47	1	2
Total	130,952	33,690		1,639	169	

Source: USDI, BLM, 1982c.

TABLE 9
Potential Vegetation Treatment Projects

Allotment	Treatment Proposed	WSA Acres Involved	Projected AUM Increase in WSA
Range Creek	Chain or burn and seed	87	12 AUMs
Little Park	Chain and seed	12	1 AUM
Total		99	13

Source: USDI, BLM, 1982c.

Visual Resources

The WSA was included in a visual resource study completed by Ray Mann Associates, Inc. (1977). About 75 percent of the WSA (about 25,300 acres) was rated as Class A scenery due to vertical relief, massive or unusual rock outcrops, variety in vegetation, the presence of water in most of the canyons, and rich and pleasing color combinations. The remainder of the WSA is Class B scenery where vertical relief is less severe and presence of water less frequent. The sensitivity of groups familiar with the area to potential changes in the landscape was rated high. Class B scenery areas in the WSA are in a foreground/middle-ground viewing area from Turtle Canyon road. The VRM class adopted for the entire WSA is Class II. Under Class II, changes in the landscape should not be evident.

Geology, topography, vegetation, and water characteristics of the WSA combine to create a highly scenic landscape. The WSA is formidable in scale, a 3,000-foot divide comprised of red and tan, narrow, broken rocky ridges, cliffs, and pinnacles. On the north, this view is softened by heavily forested slopes and running water.

Cultural Resources

A number of abandoned historical buildings are found in Range Creek along the northeast edge of the WSA. All are thought to be on private land,

although historical activity in Range Creek almost certainly included parts of the WSA. The origin of the buildings is unknown and most are no longer in use.

Range Creek was homesteaded during the 1880s or 1890s in several places along the creek. This is the most likely origin of the historic buildings. There are also unconfirmed reports of "moonshine diggings" in the WSA.

Two quarter sections of the WSA have been inventoried and one site, a rock shelter, was recorded. Although many additional significant sites were recorded along Range Creek in the early 1950s, maps have been lost and site locations for the most part are no longer known. However, more structural sites were recorded in the Range Creek vicinity than are found in the Nine Mile Canyon area 25 to 30 miles to the north, which is a well known archaeological district identified as a potential National Register site. Ten rock art sites were recorded along Range Creek, although it is certain some of these occur outside the WSA. It is from one of these sites that the Pillings Collection of Fremont Figurines (on display at the College of Eastern Utah Museum in Price) was collected. This is one of the more significant collections from a San Rafael Fremont site and has been the subject of professional studies. Based on concentrations of rock art sites, a recorded structure, arable land, and collections of significant artifacts for study, there is a potential for additional sites contributing to scientific data on the San Rafael Fremont peoples.

No sites or districts have been identified as eligible for the National Register of Historic Places, although an undetermined number in the Range Creek vicinity may have some potential. The WSA is likely to contain 30 or more sites, half of which could be eligible for National Register status.

Recreation

Road access to the WSA exists at points near or

TURTLE CANYON WSA

around its entire perimeter. On the north a road over Horse Canyon and Little Horse Canyon tops the principal ridge of the divide and then drops to a locked gate in Range Creek. The Range Creek road from this gate to another gate above the confluence of Range Creek and Turtle Canyon is accessible only by obtaining a key from the owner of the ranch and guest lodge in Range Creek. The Turtle Canyon road borders the WSA on the south and southwest. On the west, spur roads leading west off the Little Park road also reach the boundary of the WSA.

No developed trails have been located in the WSA. A historical trail reportedly in Nelson Canyon may still be present. An abandoned way nearly crosses the southeast end of the WSA from east to west beginning near the confluence of Range Creek and Turtle Canyon just north of the locked gate. Another short way begins in the east fork of Turtle Canyon, but the segment climbing out of the canyon was never built. It is passable as a foot trail and could be used to access Mitches Canyon. Numerous hiking routes through the WSA are possible using ridges and drainages. Slopes and dense vegetation can make travel difficult. Some routes require short, near-vertical rock scrambles or technical ascents. No hiking or climbing guides cover the WSA, although interpretive books on the history of the area and archaeology are available.

There are two privately owned lodges in Range Creek near the WSA presently offering services primarily to hunters. Guests at the lodges are known to use the WSA for sightseeing and some hunting. Total capacity of the lodges is about 25 people, and the normal use season could extend up to 5 or 6 months. Presently, no commercial outfitting services are offered, although hunting lodge use has been established since 1963.

Many features of the WSA make it attractive for recreation, including scenic, historic, archaeologic, and wildlife settings discussed above. Facilities present, particularly nearby lodges, are desirable features to many current and potential users. Such facilities have, in similar settings, increased access to wilderness lands for a segment of the public.

Individual features of interest to the visitor include remnants of iron concretions, contrast between strata at their contacts, unusual weathering patterns, a wide diversity in ecological sites and vegetation, and a good potential for wildlife sightings.

Range Creek offers trout fishing opportunities,

although the better fishing is adjacent to the WSA. Hunting opportunities in the WSA and its vicinity are good; however, the rugged terrain is a major limiting factor. Terrain has limited most use to areas adjacent to Little Park or Turtle Canyon and to canyon bottoms near Range Creek. About 60 to 100 hunters per year are expected to use the WSA mainly around the boundaries. Estimates are based on UDWR data and known use patterns. Chukar hunting is also known to occur, and opportunities are fair to good. Signs of nongame and game wildlife are commonly encountered in the WSA.

Hiking and climbing are the recreational activities for which the WSA is best suited. Routes between canyon bottoms and ridge tops generally follow natural drainages. Snowfall, trees, or boulders blocking the drainages and slopes make travel slow and arduous, but interesting. Waterfalls must be circumvented or climbed. There are rocky peaks along the ridges of the WSA. None are known to have been climbed. The formidable east-west cliffs could also present technical rock-climbing possibilities. Use at this time is primarily short hiking trips from the Range Creek side of the WSA for sightseeing.

No ORV use is known to occur in the WSA at this time, and all but the southeast end of the WSA would be unsuitable without major road construction. The WSA is in an area proposed in the Price River MFP to be limited to existing roads and trails. Horseback recreation in the WSA would also be limited by topography. Reliable use data, other than for hunting, are not available. Present use levels, other than for hunting, are considered low. The recreational use of the WSA is currently estimated at 500 visitor days annually. No visitor days are related to commercial outfitting. There is no ORV use in the WSA.

Wilderness Values

SIZE

The Turtle Canyon WSA is 33,690 acres in size. It is about 14 miles long northwest to southeast and 4 to 6 miles wide.

NATURALNESS

No substantially noticeable imprints or concentrations of imprints occur within the WSA. There are vehicle tracks into the WSA for about 0.5 mile along canyon bottoms of Cherry Meadow, Calf, and Nelson Canyons adjacent to Range Creek. Two old abandoned jeep trails associated with previous seismic exploration are located in the

TURTLE CANYON WSA

extreme southeast portion of the WSA. They are about 1.0 and 6.5 miles long. The longer one does not have public vehicle access. Areas along these vehicle trails cover less than 0.1 percent (30 acres) of the WSA and meet the naturalness criterion for areas under wilderness review (not substantially noticeable in the area as a whole). The entire WSA meets the naturalness criterion. Of this, 75 percent of the WSA (25,270 acres) consists primarily of relic plant communities (largely not influenced by human activities). Slopes exceeding 50 percent in this area have maintained this condition.

SOLITUDE

The size and configuration of the WSA, in combination with topography, enhance and support opportunities for solitude. Most drainages are narrow, twisting, and steep throughout most of their lengths and are separated by broken and irregular ridgelines. The eastern portion of Mitches Canyon is the most open canyon bottom area in the WSA. Even in this area, the canyon bends and turns and periodically rises in a stair-step fashion, vertically separating one canyon segment from another. Topography south and southwest of Mitches Canyon is less severe. Terrain varies from north to south, alternating between terraced beaches and talus slopes to shallow, vertical-walled canyons.

Throughout the WSA vegetation complements topography, often improving opportunities for solitude. In over 75 percent of the WSA, tree or large mountain shrub types dominate. The remainder is rock outcrop, grass, and sagebrush riparian types that include some large tree species, although they do not dominate the type. In general, the rock outcrop type occurs where topography makes its most significant contribution to opportunities for solitude. Tree cover is moderate to heavy in the pinyon-juniper, Douglas fir, and pinyon-juniper/Douglas fir types. Often the canopy is closed. Cover in the mountain shrub type is dense and, in addition to large shrubs such as mountain mahogany, includes most of the tree species found elsewhere in the WSA.

There are no significant offsite influences affecting opportunities for solitude.

Size, configuration, topography, and vegetation contribute to the ability to find a secluded spot. The combination of these elements is such that in much of the WSA open vistas, rather than secluded spots, must be sought. Vistas are found along the ridgetop, particularly along the principal ridge and in the south of the WSA.

PRIMITIVE AND UNCONFINED RECREATION

Recreational opportunities are discussed above (refer to the Recreation section).

Those outstanding primitive recreation values for which the WSA is best suited include hiking, climbing, hunting, camping, and sightseeing activities related to the WSA's scenic, cultural, geologic, and wildlife features. Based on these opportunities, the WSA meets the primitive recreation criterion for areas under wilderness review.

Opportunities for fishing in Range Creek adjacent to the WSA are good to outstanding, although opportunities for creek segments within the WSA are only fair. Horseback activities could occur in the WSA but potentially suitable routes or trails would be limited due to topography. Horseback trips for short distances in the canyon bottoms, along Range Creek, or in Mitches and Turtle Canyons are possibilities.

SPECIAL FEATURES

Differences in topographic features, vegetation productivity, variety in wildlife, and wildlife habitat represented in the WSA are highly unusual and seldom represented in an area the size of the WSA. The rugged topography in most of the WSA has maintained a pristine naturalness. The historical setting is similar to the Desolation Canyon vicinity. The archaeological potential of the area for significant Fremont artifacts has been documented.

Land Use Plans and Controls

Right-of-way grants for oil and gas exploration have been made for the Turtle Canyon road forming the south boundary of the WSA. Two of these remain in effect.

There are three in-held State sections in the WSA and all are inaccessible and in extremely rugged terrain. There is no surface use of the State lands at this time. The likelihood of mineral development of these State lands is good due to favorable geologic conditions. Further, the management philosophy for all State sections is to maximize economic returns for the State School Fund. No private or split estate lands are located in the WSA.

Emery County has zoned the general area, including the Turtle Canyon WSA, for mining and grazing (Emery County Board of Commissioners, 1984). Land use objectives are:

1. To promote the conservation of water,

TURTLE CANYON WSA

land, mineral, and other resources.

2. To prevent the degradation of the natural and social environment.
3. To foster agriculture, mining, and industry within the State.
4. To provide a location for certain types of agricultural, industrial, and other uses which, because of certain characteristics of operation such as odor, noise, etc., are not compatible with urban development.

Permitted uses include grazing, pond construction, minor mines and utility projects, and buildings. Major construction, mining, etc. require county review and approval.

Federal lands in the WSA are managed by the Price River Resource Area under the existing MFP for the Range Creek Planning Unit. The updated Price River MFP was final in September 1983. Specific management actions in the MFP generally allow for multiple use, as described in the No Action Alternative.

Socioeconomics

DEMOGRAPHICS

The WSA is located in the northeastern portion of Emery County. However, due to access and population distribution, Carbon County, more than Emery County, would be the area most affected by wilderness designation or nondesignation. Both counties are discussed below.

Carbon County can be summarized as rural with an urban area around the City of Price. Emery County can also be classified as rural with a string of small communities in Castle Valley. Carbon and Emery Counties had a 1982 population of 24,600 and 12,900, respectively. Communities closest to the WSA include: Price, Wellington, East Carbon, Sunnyside, and Green River. The City of Price (1980 population of 9,086) is located in Carbon County, 30 air miles northwest of the WSA, and serves both Carbon and Emery Counties as a major service center (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The adjacent communities of East Carbon and Sunnyside (total 1980 population of 2,553) are located in eastern Carbon County, 8 air miles northwest of the WSA. Green River (population of 1,048), located on the county line between Emery and Grand Counties, lies 24 air miles south of the WSA.

Carbon and Emery Counties comprise 5,916 square miles or 3,781,952 acres. About 73 percent

of the counties is managed by the Federal Government, 10 percent by the State, and 17 percent is privately owned.

EMPLOYMENT

Growth in the affected area, particularly Carbon County, is linked with the coal industry. The region's population increased 62 percent between 1970 and 1980 and Emery County has the highest rate of growth in Utah for the largest share of income earned in the region (USDC, Bureau of the Census, 1981). Between 1981 and 1983 employment in the local coal industry decreased 15 percent (Utah Department of Employment Security, 1981 and 1983). Despite the recent slump the coal industry remains the area's largest employer. Construction and operation of electrical generating plants also provide a large share of employment in the area. Local income and employment attributable to these powerplants are reflected in the construction, public utility, and mining sectors. A number of other businesses depend on the mines and powerplants to purchase their products, and many retail and service businesses depend on the workers' local expenditures. A profile of wages, salaries, and employment for Carbon and Emery Counties is shown in Table 10.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration and production, livestock production, woodland production, and recreation. Table 11 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has no mining claims and, therefore, no revenue has been expended in mining claim assessment or development. Geophysical exploration in the WSA has generated some temporary local employment and income. No oil and gas or mineral production has occurred in the WSA. Therefore, mineral and energy resource production from the WSA has not contributed to local employment or income.

Eight livestock operators have a total grazing privilege of 169 AUMs within the WSA. If all this forage were utilized, it would account for \$3,380 of livestock sales, including \$845 of ranchers' returns to labor and investment.

No woodland products are harvested from the WSA; therefore, no revenue has been generated.

The WSA's nonmotorized recreational use and related local expenditures are low and insignifi-

TURTLE CANYON WSA

TABLE 10
1981 Personal Income and Employment
Carbon and Emery Counties, Utah

Industrial Sector	Carbon County		Emery County	
	Income (Percent)	Employment (Percent)	Income (Percent)	Employment (Percent)
Agriculture	Less than 1	Less than 1	Less than 1	Less than 1
Total Agricultural	Less than 1	Less than 1	Less than 1	Less than 1
Mining	45	27	48	39
Construction	6	5	23	17
Manufacturing	2	3	Less than 1	Less than 1
Transportation and Public Utilities	11	8	15	13
Wholesale Trade	5	5	1	1
Retail Trade	8	15	2	6
Finance, Insurance and Real Estate	2	3	1	1
Services	9	15	2	6
Other	—	—	—	—
Total Private Industry	88	79	93	85
Federal Government	2	4	1	3
State and Local Government	10	17	6	12
Total Government	12	20	7	15
Total Nonagricultural	100	99	100	100
Unemployment (1st Quarter, 1983)	16.9			9.3
	(Dollars)	(Jobs)	(Dollars)	(Jobs)
Total Employment and Earnings	\$172,517,000	9,914	\$128,985,000	\$6,165
Total Personal Income	\$229,540,000		\$97,563,000	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1981 and 1983.

Note: Because of rounding, numbers are not additive. Employment figures include wage and salary employment. The relative importance of farm equipment is, therefore, underrated.

cant to the local economy. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Turtle Canyon WSA is estimated as about 500 visitor days/year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Carbon and Emery Counties.

The WSA generates Federal revenues from mineral leases and livestock grazing fees (refer to Table 11).

Oil and gas leases in the WSA cover approximately 28,038 acres. Coal leases cover about 740 acres. At \$3 per acre, lease rental fees generate up to \$86,334 of Federal revenues annually. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are

TABLE 11
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	None	None
Oil, Gas, & Coal Leases & Production	None	\$86,334
Livestock Grazing	\$3,380	\$237
Recreational Use	Less than \$2,050	None
Total	Less than \$5,430	Up to \$86,571

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

unknown; however, the permittees in the WSA can use up to 169 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$237 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amounts of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil, gas, and coal exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown but mineral potential is

estimated as moderate. The following is a worst-case analysis based on the assumption that minerals within the WSA would be developed sometime in the future and cause the following disturbance: oil and gas, 310 acres; coal, 30 acres; and uranium, 20 acres. Exploration of the coal resource has already taken place outside the WSA and it is assumed that future development (construction of surface facilities) would also continue to occur outside of the WSA. Additional exploratory drilling and possible construction of a ventilation shaft could still be required on lands within the WSA. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.) It is assumed that 99 acres of vegetation treatments would occur.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Disturbance of up to 459 acres would result in short-term increases in fugitive dust emissions; however, overall air quality would not be degraded. While air quality would not be expected to be degraded as a result in implementing this alternative, development of the tar sand resource in the nearby Sunnyside Special Tar Sand Area (STSA) could affect air quality in the WSA (USDI, BLM, 1984b).

GEOLOGY

An estimated 360 acres of mineral-related surface disturbance could occur under this alternative. Surface disturbance would not likely alter the geologic environment of the WSA. In addition to surface disturbance, subsurface effects resulting from underground coal mining could also occur. An undetermined amount of subsidence could result in a settling of the surface and possibly surface fracturing.

SOILS

It is estimated that up to 360 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about 1.0 cubic yard/acre/year on undisturbed areas and 9.0 cubic yards/acre/year on disturbed areas. Soil loss on the 360 acres would increase from 360 cubic yards/year to 3,240 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, annual soil loss in the WSA could increase by approximately 2,880 cubic yards over current annual soil loss.

TURTLE CANYON WSA

Any soil loss resulting from the 99 acres of vegetation treatments would be temporary until new vegetation was established. After that time, soil loss would decrease below present levels.

VEGETATION

The anticipated disturbance of 459 acres from mineral exploration and development and vegetation treatment would not be expected to significantly affect any vegetation type in the WSA. Over time, disturbed areas would likely revert back to the original vegetation type unless the areas were disturbed again (e.g., retreating vegetation treatment areas). No disturbance of the riparian vegetation types would be anticipated.

Gaillardia flava, *Hedysarum occidentale* var. *Canone* and *Psoralea polyadenia* var. *jonesii*, all candidate plant species for possible threatened or endangered status, may be found in the WSA. Before authorizing surface-disturbing activities (459 acres potential), BLM would conduct site-specific clearances of the potentially disturbed areas. If these species could be affected, BLM would initiate Section 7 consultation with FWS, as required by Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered, or candidate plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Most erosion within the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development would impact 360 acres under this alternative, with a soil loss increase of approximately 2,880 cubic yards per year. This increase in erosion could also cause increased stream sediment loads and possible changes in some chemical parameters from dissolution and leaching in short stream segments. However, deterioration in overall water quality in Range Creek would not be expected. Water quality in the Green River also would not be affected. Oil and gas leasing Category 2 (standard and special stipulations) covers the entire WSA. The special stipulations attached to this leasing category are specifically designed to protect sensitive water resources. The 99 acres of vegetation treatments would slightly benefit water quality after vegetation growth was established due to reduction in erosion.

The extent and quality of the ground water

resource in the WSA are not well known. However, the location of several springs in the WSA indicates ground water presence. Underground coal mining could disrupt ground water movement and lower ground water quality. Some of the springs in the WSA could dry up or experience reduced flow. Development of the oil and gas resource, along with the chaining-and-seeding project, would likely not affect ground water in the WSA.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The potential for exploration and/or production of oil and gas would remain, and the wilderness stipulations on post-FLPMA leases would be lifted. Approximately 5,652 acres of unleased land would be available for oil and gas leasing. The entire WSA would remain in oil and gas leasing Category 2 (open with standard and special stipulations).

Based on cost, topography, and uncertainty, immediate exploration of much of the WSA is not likely to occur. The WSA's petroleum potential is estimated at 60 to 300 billion cubic feet of in-place natural gas and 10 to 50 million barrels of in-place oil. Of this, it is estimated that 18 to 90 billion cubic feet of gas and 3 to 15 million barrels of oil are recoverable.

Coal

The potential for future exploration and/or production of coal would remain. The 740 acres under lease and any future leases could be developed without concern for wilderness values. Mining methods would be underground, and no surface facilities would be expected to be located in the WSA. Even if major changes in technology occurred and thinner seams could be mined economically under much greater overburden, substantial amounts of more accessible coal exist outside the WSA. Approximately 55 million tons of in-place coal lie within the WSA. About 27 million tons would be recoverable.

Locatable Minerals

Mineral location would continue to be prohibited on 3,717 acres of the WSA due to an oil shale withdrawal. This area would remain closed to mining claim location until this withdrawal is relinquished. The remaining acreage would remain open to mining claim location. Potential for less than 500 tons of uranium oxide exists. This recoverable resource could be explored or developed if valid mining claims were located.

TURTLE CANYON WSA

Salable Minerals

Sand, gravel, and building permits could be issued. Salable minerals for the staking of claims in areas not covered by the oil shale withdrawal could occur. However, the potential for these resources in the WSA is low, and it is assumed that they would not be developed due to easier access and more favorable deposits elsewhere.

WILDLIFE

Species sensitive to human encroachment or surface disturbance (i.e., black bear, mountain lion, bighorn sheep, and nesting raptors) could be forced from historical habitat by mineral-related surface-disturbing activities on 360 acres.

Present black bear and mountain lion habitat in the WSA would be reduced from 33,690 to 28,450 acres. Habitat for cliff-nesting raptors would be reduced from 33,690 to 32,330 acres over time as development of the area occurred. Suitable peregrine falcon nesting habitat would be reduced from 9,070 to 3,830 acres.

Bighorn sheep populations would be expected to increase from 3 to 36 animals, even though about 5,080 acres of bighorn sheep range could eventually become unsuitable due to development and human encroachment. Only about 8 percent of the total bighorn sheep range is located in the WSA.

Other big game populations would also be expected to increase over time even though habitat loss would occur. Population increases would be possible because the habitat range is not currently being used at its capacity. For example, the carrying capacity of critical deer winter range could be reduced from 423 to 355 deer as the suitable range was reduced from 8,455 to 7,095 acres. Winter deer populations could still increase from 188 to 355. The carrying capacity of summer range within the WSA could be reduced from 367 to 320 as 1,280 of the 9,910 acres of summer range in the WSA were rendered unsuitable by mineral development. Summer deer populations could still increase from 155 to 320.

Elk do not occupy the WSA during the summer. Mineral-related surface disturbance would reduce elk winter range in the WSA from 32,700 to 27,460 acres. Carrying capacity would be reduced from 112 to 94, which is still substantially above the present population of seven elk.

Vegetation treatment projects could lead to increased carrying capacity for deer, although they would be implemented to increase livestock AUMs. However, since winter forage is not now a

limiting factor for deer in the area, the effect on deer would be negligible.

Prior to any disturbance, BLM would initiate Section 7 consultation with the FWS concerning threatened, endangered, or candidate wildlife species, as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these species, it can reasonably be concluded that the viability of these populations in the WSA would be preserved under the No Action Alternative.

FOREST RESOURCES

In the Turtle Canyon WSA, no significant effect on woodland or forest resources would be anticipated, although up to 459 acres of woodland or forest could be lost as a result of surface disturbance. This loss would be considered minimal due to the availability of similar resources outside the WSA. No harvest of forest products presently occurs in the WSA and none is considered likely in the foreseeable future.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Price River MFP. The 169 AUMs currently allocated within four allotments are utilized by eight livestock permittees.

Potential exists for 459 acres of disturbance by mineral exploration and development and vegetation treatment. This could temporarily reduce available AUMs. However, once disturbed areas were revegetated, AUMs could actually increase. The 99 acres of vegetation treatment would result in an increase of 13 AUMs.

Motorized vehicles are seldom used to manage livestock within the WSA, and no change is expected for livestock management in the future. There are no existing range developments in the WSA. New developments could be implemented without wilderness considerations.

VISUAL RESOURCES

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 459 acres of surface disturbance from mineral and energy exploration and development and vegetation manipulation would be degraded. Therefore, VRM Class II management objectives would probably not be met during the short term. The entire WSA (33,690 acres) has been classified as VRM Class II. Even after rehabilitation, some

TURTLE CANYON WSA

permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area for energy and mineral exploration and development (worst-case analysis), visual quality in the WSA would be significantly reduced. The probability of extensive energy and mineral exploration and development is low. Vegetation treatment areas would probably be visible and exceed Class II management objectives until the treated area returned to natural vegetation. This intrusion could be considered permanent if the manipulated area were regularly maintained.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 459 acres of surface disturbance by mineral exploration and development and vegetation treatment under this alternative. Archaeological and historical sites, particularly those along Range Creek, could be inadvertently damaged or destroyed by surface disturbance. Inventories for site recordation and mitigation of impacts would take place prior to any surface disturbance; however, inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown. Vandalism (not currently a problem) could increase in proportion to the general population increase.

RECREATION

The entire 33,690-acre WSA would be open to ORV use. Current ORV use is low due to steep terrain. Most ORV use would be associated with hunting. Publicly accessible ways remain available for ORV use. New access roads in the WSA could be developed without wilderness considerations.

Up to 459 acres could be disturbed by mineral and energy activities and vegetation treatments. Primitive recreational opportunities would be diminished on affected areas. If roads, vehicular ways, and drill pads are located throughout the WSA (worst-case analysis), primitive recreational opportunities could be lost in the majority of the area. However, roads and ways created for mineral exploration and development would improve access into the area for nonprimitive recreation. Vegetation treatment would also have short- and long-term impacts on sightseeing and primitive recreation because of the effects of intrusions on scenic and primitive values.

Future recreational trends in the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency,

1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreational use is expected to increase from 500 current visitor days per year to 745 visitor days at the end of 20 years. Present recreation use is primarily associated with hunting, and future use would be expected to be the same.

WILDERNESS VALUES

None of the 33,690-acre WSA would be designated wilderness, and management would continue under the Price River MFP. Identified wilderness values in the WSA would not receive the degree of protection afforded by wilderness designation. Mineral and energy exploration and development and vegetation treatment could disturb an estimated 459 acres. Surface disturbance would result in a loss of naturalness, solitude, and primitive recreation in the majority of the WSA if roads, vehicular ways, and drill pads were located throughout the area. If mineral development and proposed vegetation treatment occurred, the majority of the WSA would not meet the naturalness criterion.

The WSA would not be managed to preserve outstanding opportunities for solitude; however, severe and rugged terrain might preserve some outstanding opportunities for solitude in much of the WSA. Topographic and vegetation screening would only be altered in areas with surface disturbance or affected by disturbance. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing and vehicle-related activities that may occur in the area. A visitor's opportunity to find a secluded spot could be reduced throughout the WSA.

LAND USE PLANS AND CONTROLS

Land use plans for the WSA are the Emery County Zoning Plan and the BLM Price River MFP. This alternative would not change the present or expected use of the lands in the WSA, and would be consistent with the multiple-use concept of those plans. This alternative would also be consistent with the management philosophy of the State of Utah, which emphasizes economic return from State school sections. No private or split estate lands are located in the WSA.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing

TURTLE CANYON WSA

ability to explore and develop mineral resources would remain as at present. If the oil, gas, coal, and uranium in the WSA were developed, it would not lead to a significant increase in employment and income for Carbon and Emery Counties. The probability of economic development of minerals within the WSA is moderate (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no livestock-related economic losses because the existing grazing use (169 AUMs) and ability to maintain, replace, and build new range developments would remain as at present. The proposed vegetation treatment that would produce 13 AUMs of new allocated forage could lead to \$260 of livestock sales including \$65 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase from the current 500 visitor days annually to 745 visitor days/year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 5,652 acres in the WSA not currently leased for oil and gas and 1,620 acres of coal lands that are currently not leased. If leased they would bring up to \$21,816 additional Federal lease fee revenues per year, in addition to new royalties from lease production and bonus bids from new oil and gas leases in KGSs. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently \$237 per year) would continue. The additional 13 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by \$18 annually. About 50 percent of these revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (33,690 Acres) (Proposed Action)

As noted in the Description of the Alternatives section, major changes that could occur in the

33,690-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in oil and gas leasing Category 4 (closed to leasing). No new coal leasing could be allowed in the WSA. The WSA would also be closed to ORV use, would be managed under VRM Class I, and 99 acres of proposed vegetation treatment would not be allowed.

For the following analysis, it is assumed that no mining claims would be located in the WSA. It is also assumed that certain existing oil and gas leases held as part of a unit (approximately 9,107 acres) would be developed resulting in 30 acres of surface disturbance. The remaining leases would expire before production of commercial quantities. These oil and gas leases would not be renewed and future leasing of oil and gas, as well as any other mineral resource leasing, would not be allowed. Development of the coal leases in the WSA would occur. Surface disturbance within the WSA would be limited because of the underground mining methods and the location of surface facilities outside the WSA. Additional exploratory drilling and possible construction of ventilation shafts could still be necessary resulting in about 30 acres of surface disturbance. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (60 acres vs. 459 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, water, and forest resources would be insignificant for the All Wilderness Alternative. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

It is estimated that up to 60 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 1.0 cubic yard/acre/year on undisturbed areas and 9.0 cubic yards/acre/year on disturbed areas. Soil loss on the 60 acres would increase from 60 cubic yards/year to 540 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, with this alternative, maximum annual soil loss in the WSA would increase by approximately 480 cubic yards annually compared to an increase in soil loss of 2,880 cubic yards annually

TURTLE CANYON WSA

for the No Action Alternative. Therefore, implementation of this alternative would result in an annual 2,400 cubic yards less soil than with the No Action Alternative. Any erosion control benefits arising from the proposed 99-acre vegetation treatment would, however, be foregone under this alternative.

WATER RESOURCES

Restraints on mineral development would protect water quality. The potential for increased soil erosion and sediment yield from 60 acres of mineral-related disturbance would be significantly less than changes in water quality discussed under the No Action Alternative. However, under this alternative, benefits to the watershed from the proposed 99-acre vegetation treatment would be foregone. Improvements or expansion of existing waters could not occur.

Oil and gas exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not be expected to significantly alter ground water flow or reduce ground water quality. Underground coal mining could disrupt ground water movement and lower ground water quality. Some of the springs in the WSA could dry up or experience reduced flow.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Approximately 28,038 acres (7,730 acres pre-FLPMA and 20,308 acres post-FLPMA) are under oil and gas lease. However, no exploration or development of oil and gas is presently occurring within the WSA.

Existing pre- and post-FLPMA leases could be developed subject to the stipulations issued at the time of leasing. It is unlikely that existing leases would be developed or a showing of commercial quantities made prior to their expiration dates, with the exception of certain pre-FLPMA and post-FLPMA leases (approximately 9,107 acres) currently being held as part of a unit. Assuming that the oil and gas resource is evenly distributed throughout the WSA, up to 16 million barrels of in-place oil (5 million barrels recoverable) and up to 96 billion cubic feet of in-place natural gas (29 billion cubic feet recoverable) could be produced. Expired leases would not be reissued.

Exploration for and development of the remaining potential resource of up to 34 million barrels of in-place oil and up to 204 billion cubic feet of

in-place natural gas, with up to 10 million barrels of oil, and up to 61 billion cubic feet of natural gas potentially recoverable could be foregone under this alternative.

Coal

The production of coal already under lease would not be foregone. Mining methods would be underground and no major surface facilities would be located in the WSA. Some additional drilling and perhaps construction of a ventilation shaft could be necessary. Production and recovery of up to 27 million tons of the 55 million tons of in-place coal could occur under this alternative.

Locatable Minerals

The entire 33,690-acre WSA would be withdrawn from mining claim location. A 3,717-acre area is presently closed to mining claim location by an oil shale withdrawal. There are no mining claims (as of January 1985) within the WSA. The potential exists for less than 500 tons of uranium oxide. Development work, extraction, and patenting would be allowed on valid claims staked before wilderness designation.

Formations favorable for uranium occur in approximate depths of 5,000 to 12,000 feet below the surface. Uranium from these formations is not expected to be recovered.

Salable Minerals

Sand, gravel, or building stone permits could not be issued. Other salable minerals would not be available for the staking of claims or purchase. The WSA has a low potential for these resources due to limited favorability for hardrock minerals, low value, common occurrence of most mineral materials present, and the location of the WSA.

WILDLIFE

Most wildlife species (particularly those such as black bear, mountain lion, nesting raptors, and bighorn sheep which are sensitive to human presence and surface disturbance) would benefit by designation. It is estimated that 60 acres of surface disturbance could result from mineral exploration and development with this alternative. Thus, little, if any, habitat loss would result to wildlife species. Black bear and mountain lion populations are considered healthy and populations may not expand, although optimum habitat conditions would be maintained. Habitat for nesting raptors (9,070 acres suitable including peregrine falcon habitat) would be protected.

Bighorn sheep populations in the WSA could eventually increase from the current estimate of

TURTLE CANYON WSA

three animals to 71 animals due to habitat protection of 10,370 acres of historical range. The WSA constitutes about 8 percent of the total range identified for the Range Creek herd.

Big game populations would be expected to increase over time. Designation would provide suitable habitat conditions on 8,455 acres of critical winter range and 9,910 acres of summer range for deer populations. The present winter populations of seven elk could expand to the carrying capacity of 112 for the 32,700 acres of range within the WSA, while the WSA could receive summer use by 10 elk (985 acres of range). The proposed vegetation treatment that might increase deer winter forage would not occur.

Threatened, endangered, and candidate species would benefit from the preservation of naturalness and solitude under this alternative. As discussed for the No Action Alternative, appropriate measures would be taken to protect these species that might occur in the WSA from surface disturbance. Therefore, the viability of populations of threatened, endangered, and candidate species would be preserved under this alternative.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Price River MFP. The 169 AUMs currently allocated in the WSA are utilized by the livestock of eight permittees and would remain available for livestock forage. Development of future roads or other livestock management facilities in the WSA could be restricted to preserve wilderness values. Since motorized vehicles are rarely used to manage livestock, little overall effect on livestock grazing is expected.

Within the WSA the proposed 99 acres (13 additional AUMs) of vegetation treatment would not be allowed. The anticipated 60 acres of surface disturbance would not reduce available AUMs. New range developments could be allowed, if determined necessary for the purposes of range and/or wilderness protection and the effective management of these resources.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through management under VRM Class I, which generally allows for only natural ecological change.

With this alternative the possible disturbance of

60 acres for mineral exploration and development could occur. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. Visual quality would, however, probably not be reduced in the WSA as a whole.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. The potential exists for 60 acres of surface disturbance by mineral exploration and development. Inventories for site recordation and mitigation of impacts would take place prior to surface disturbance. Inadvertent loss or damage could occur to cultural resources within disturbed areas. However, the chance for inadvertent loss would be much less with this alternative than with the No Action Alternative. Vandalism (not currently a problem) could increase in proportion to the general population increase.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an increase in primitive recreational use above the baseline rate. Primitive recreation values of the WSA would be protected by reduction in potential surface disturbance. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. No visitor days are attributed to ORV use in the WSA; therefore, none would be foregone under this alternative. About 8 miles of ways would be closed to vehicular use. Commercial outfitting could benefit from wilderness designation. As recreation use increased, commercial operations based on primitive recreational activities could apply for use of the WSA.

Mineral-related surface disturbance on up to 60 acres could cause localized impairment of primitive recreational values in the WSA, especially if it occurred in the form of roads and drill pads.

Judging from use densities of a number of well

TURTLE CANYON WSA

known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distribution about the WSA; and the availability of similar sites, it is estimated that, following designation, use could be as much as 3,369 visitor days per year (USDI, BLM, 1985). This is 2,869 visitor days over the area's current estimated 500 annual visitor days.

WILDERNESS VALUES

Wilderness designation and management would ensure the preservation of wilderness values in the WSA. All 33,690 acres of the WSA meet the *Wilderness Act* criteria for naturalness and outstanding opportunities for solitude and primitive, unconfined recreation. Special features in the WSA (i.e., wildlife, scenic, and cultural values) would also be protected and preserved.

Potential exists for 60 acres of surface disturbance due to mineral exploration and development. Wilderness values within this acreage could be lost, especially if disturbance occurred in the form of roads. It is unlikely that disturbance would impair wilderness values throughout the WSA as a whole.

Recreational use of the area could increase to as much as 3,369 visitor days/year with public awareness of the area as wilderness. The majority of this use would be from hiking, hunting, sight-seeing, and camping. Present use levels are estimated at 500 visitor days. It is not anticipated that this recreation use increase would significantly affect wilderness values.

LAND USE PLANS AND CONTROLS

Wilderness designation would not be consistent with Emery County's multiple-use concept: Emery County zoning implies a policy for multiple use.

Because the State land within the WSA would be exchanged for lands outside the WSA, wilderness designation would not conflict with the State of Utah's policy to maximize economic returns.

The BLM Price River MFP does not provide for wilderness designation. A decision by Congress to designate the WSA as wilderness would be an amendment to the MFP.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there

could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation.

Livestock use and ranchers' income would continue as at present with \$3,380 of livestock sales, including \$845 of ranchers' return to labor and investment. Proposed livestock developments would be foregone, along with any resulting increase in ranchers' income. Ninety-nine acres of vegetation treatment have been proposed. If this were implemented and the 13 anticipated additional AUMS obtained, ranchers' returns to labor and investment would increase by \$65.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is nonexistent; therefore, no ORV opportunities would be foregone by wilderness designation.

The eventual loss of 18,931 acres now leased for oil and gas would result in an eventual loss of up to \$56,793 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$16,956 annually in Federal revenues from the 5,652 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone. An undetermined amount of revenue could also be lost by foregoing the opportunity to lease additional coal lands in the WSA.

If the proposed vegetation treatment is not developed and used, an estimated annual \$18 of Fed-

eral grazing revenues from 13 increased AUMs would be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increase. There are presently no commercial outfitters using the WSA; however, designation could lead to commercial recreational use in the WSA.

Partial Wilderness Alternative (27,960 Acres)

The major activities that would occur in the portion of the WSA designated as wilderness are the same as those described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 27,960-acre area designated as wilderness and the 5,730-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, no mining claims would be explored and developed. It is also assumed that certain existing oil and gas leases (covering approximately 9,107 acres) held as part of a unit would be developed, resulting in 30 acres of surface disturbance. The remaining leases in the designated portion would expire before production of commercial quantities. Development of existing coal leases would occur. Surface disturbance in the designated portion of the WSA would be limited because of the underground mining methods and location of surface facilities outside the WSA. Additional exploratory drilling and possible construction of ventilation shafts could still be necessary and would result in about 30 acres of surface disturbance. The proposed vegetation treatment areas would be located in the designated portion of the WSA and, therefore, would not be allowed.

It is assumed that, within the nondesignated area, 53 acres would be disturbed sometime in the future due to oil and gas development. Overall, 113 acres of surface disturbance could occur within the WSA. This amount would be 346 acres less than under the No Action Alternative and 53 acres more than the All Wilderness Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 459 acres of surface disturbance, determined

no significant effect to air quality, geology, vegetation, water, and forest resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes 113 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same impacts to air quality, soils, vegetation, water resources, mineral and energy resources, wildlife, livestock grazing, cultural resources, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

SOILS

It is estimated that up to 113 acres of soil could be disturbed by mineral exploration and development. Of that, 60 acres would be within the designated portion and 53 acres would be in the nondesignated area. The average rate of soil loss at present is estimated at 1.0 cubic yard/acre/year on undisturbed areas and 9.0 cubic yards/acre/year on disturbed areas. Soil loss on 60 disturbed areas in the designated portion would increase from 60 cubic yards/year to 540 cubic yards/year. Soil loss in the nondesignated portion on 53 disturbed acres would increase from 53 cubic yards/year to 477 cubic yards/year. Total soil loss in both the designated and undesignated portions of the WSA would increase from 113 cubic yards/year to 1,017 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under the Partial Wilderness Alternative, maximum annual soil loss within the designated portion would increase by approximately 480 cubic yards over current annual soil loss. Maximum annual soil loss within the nondesignated portion would increase by approximately 424 cubic yards over current annual soil loss.

VEGETATION

Within the designated area, 60 acres could be disturbed by mineral exploration and development. Vegetation composition would basically remain the same, with no major changes in vegetation types. About 1,000 acres of potential habitat for the candidate plant species *Gaillardia flava* are located in the designated area of the WSA. This habitat would receive added protection from wilderness designation.

The anticipated maximum of 53 acres disturbed

TURTLE CANYON WSA

within the nondesignated portion would not have a significant impact on vegetation. However, within the nondesignated portion, 5,700 acres of habitat for *Gailardia flava* exists. Two other candidate species *Hedysarum occidentale* var. *canone* and *Psoralea polyadenia* var. *jonesii* may also be found within the WSA. Prior to any surface-disturbing activity in or out of the designated wilderness, Section 7 consultation would be initiated with FWS, and a biological opinion initiated, if appropriate, as required under provisions of the Endangered Species Act and BLM policy. Appropriate measures to protect these plants would be implemented by BLM, and the viability of threatened, endangered, and candidate plant species would not be threatened.

WATER RESOURCES

Restraints on mineral development would protect water quality. The potential for increased soil erosion and sediment yield from 113 acres of mineral-related disturbance (60 acres in the designated area and 53 acres in the nondesignated area) would be less than changes in water quality discussed with the No Action Alternative. However, with this alternative, benefits to the watershed from the proposed 99-acre vegetation treatment projects would be foregone. Improvements or expansion of existing waters could not occur.

Oil and gas exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not be expected to significantly alter ground water flow or reduce ground water quality. Underground coal mining could disrupt ground water movement and lower ground water quality. Some of the springs in the WSA could dry up or experience reduced flow.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Anticipated impacts would be similar to the All Wilderness Alternative, except 5,730 additional acres would be available for less restrictive conventional oil and gas production. This alternative would have little effect on approximately 9,107 acres of unitized leases, which fall within the 27,960-acre designated area. These leases could be developed.

The 27,960-acre area that would be designated wilderness would be placed in Category 4 status with no new leasing. Activities on existing leases would occur subject to the stipulations issued at the time of leasing.

Development in the undesignated area would allow recovery of an estimated additional 3 to 15 billion cubic feet of natural gas over the 29 billion cubic feet of natural gas that would be recoverable with the All Wilderness Alternative. Development in the undesignated portion of the WSA would allow recovery of an estimated 0.5 to 2.0 million barrels of oil above the up to 5 million barrels of in-place oil that would be recoverable with the All Wilderness Alternative.

Within the 5,730-acre nondesignated portion of the WSA, the oil and gas leasing category would remain Category 2, open with special stipulations. Wilderness stipulations on post-FLPMA leases would be lifted. About 4 to 6 miles of the Uncompahgre Uplift in the WSA would remain available for exploration.

Coal

The production of coal from 740 acres of existing leases would not be foregone. Mining methods would be underground and no surface facilities or disturbance would occur within the WSA, with the possible exception of a ventilation shaft and some additional exploratory drilling. However, no additional leases would be issued for the remaining 1,620 acres in the WSA thought to contain minable coal.

Locatable Minerals

The nondesignated area (5,730 acres) would remain open to mining claim location. No claims now exist within the WSA (as of January 1985) but claims could be located in the future and explored or developed without concern for wilderness values.

The designated area (27,960 acres) would be closed to mining claim location. A 3,717-acre area is presently closed to mining claim location by an oil shale withdrawal.

The potential for less than 500 tons of uranium oxide occurs within the WSA. Formations favorable for uranium range in approximate depths of 5,000 to 12,000 feet below the surface. Uranium from these formations is not expected to be recovered.

Salable Minerals

Sand, gravel, or building stone permits could be issued only on the 5,730 acres not designated as wilderness. Other salable minerals would also be available for staking of claims or purchase in only the nondesignated portion. The WSA has a low potential for these resources due to limited favorability for hardrock minerals, low value, common occurrence of most mineral materials present, and the location of the WSA.

WILDLIFE

Most wildlife species (particularly those such as black bear, mountain lion, bighorn sheep, and nesting raptors, which are sensitive to human encroachment or surface disturbance), would benefit by designation of 27,960 acres of the WSA as wilderness. Black bear and mountain lion populations are considered healthy. About 210 acres presently occupied by these species could become unsuitable as habitat if oil and gas exploration occurred in the area not designated. About 33,580 acres of habitat for nesting raptors, including 9,070 acres of peregrine falcon habitat, would remain suitable, while 110 acres of raptor habitat would become less suitable as access and development were established in the nondesignated portion of the WSA.

Bighorn sheep populations could eventually increase from three to 70 due to preservation of 10,160 acres of historical range. About 210 acres of bighorn sheep habitat could become unsuitable with development in the portion of the WSA not designated as wilderness. The WSA constitutes about 8 percent of the total range identified for the Range Creek herd.

Big game populations could be expected to expand over time. Designation would protect habitat conditions on 8,345 acres of critical deer winter range and 9,910 acres of summer range and would allow for expansion of mule deer numbers from 188 to 417 during winter and from 155 to 367 during summer. Approximately 110 acres of critical winter range would be rendered unsuitable by development in the portion not designated.

The present winter population of seven elk could expand to 110 within the 32,340 acres of winter range that would remain suitable within the WSA. About 360 acres of elk winter range would be rendered unsuitable by development in the area not designated. The 985 acres of elk summer range within the designated wilderness could support 10 elk.

The proposed vegetation treatment would not be implemented and any resulting increases in forage for wildlife would be foregone.

Habitats for threatened, endangered, and candidate species would be protected by wilderness designation of 27,960 acres. The viability of populations of these species would be preserved under this alternative.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Price River MFP. Partial

wilderness designation would affect domestic livestock grazing essentially the same as the All Wilderness Alternative. Of the 169 AUMs allocated in the WSA, 17 would be within the nondesignated portion and 152 within the designated portion. Development of future roads or other livestock management facilities (none are currently planned) for use with 152 AUMs in the designated portion could be restricted to preserve wilderness values. Potential vegetation treatment on 99 acres (for a total 13-AUM increase) in the designated area would not be allowed. Surface disturbance of 60 acres in the designated portion and 53 acres in the nondesignated portion would not be expected to reduce available AUMs.

In the 5,730-acre nondesignated portion, grazing use of 17 AUMs would remain available for livestock as presently allotted. New range developments (none are currently planned) could be allowed in this area without concern for wilderness values.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual quality. On the designated portion, potential for surface-disturbing activities that would impair visual quality would be reduced to 60 acres. VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected.

Within the nondesignated area, VRM Class II objectives would be applied to reduce impacts from surface-disturbing activities (53 acres). Although mitigating measures would be applied to reduce visual contrasts, visual quality would be degraded and VRM Class II objectives would not be met during the short term. Even after rehabilitation, some permanent localized degradation could be expected. If roads and drill pads are developed throughout the nondesignated area (worst-case analysis), visual quality could be significantly reduced.

RECREATION

Impacts on recreational values and opportunities for the 27,960-acre area designated wilderness would be as described for the All Wilderness Alternative. No impact on ORV recreational use would be expected due to the lack of such activity in the area; however, approximately 0.5 mile of ways within the designated portion of the WSA would be closed to ORV use.

TURTLE CANYON WSA

Within the designated portion, use would continue to be primarily for primitive recreation. Use in the WSA could increase to about 2,796 visitor days as a result of wilderness designation.

Primitive recreation values within the designated 27,960 acres could be enhanced through protection from surface-disturbing activities. Only 60 acres of disturbance are estimated within the designated portion. This disturbance could result in localized impairment of primitive recreational values.

An estimated 53 acres of disturbance could occur in the nondesignated portion of the WSA. Increased access to the area could increase motorized recreation activities and most likely increase hunting pressures to the general area. This increase and pressure could have a negative effect on primitive values present in the non-designated portion. About 7.5 miles of ways would remain open to vehicular use.

WILDERNESS VALUES

Impacts to wilderness values would be the same as with the All Wilderness Alternative on 27,960 acres that would be designated. Naturalness, outstanding opportunities for solitude and primitive recreation, and special features found throughout the 27,960 acres would be preserved.

The possible mineral-related surface disturbance of 60 acres on the designated portion and 53 acres on the nondesignated portion would be related to mineral exploration and development. On the 5,730 acres, mineral exploration and development on 53 acres could occur without concern for wilderness values. Outstanding values and naturalness could be foregone in and near the impacted areas.

Exploration for gas and possible establishment of ORV use (once public road access is available) could result in roads, drill sites, and traveled ways. The surrounding area could be affected by sights and sounds associated with surface disturbance, and this area would no longer meet the standard for solitude.

LAND USE PLANS AND CONTROLS

Existing land use plans would be affected as discussed under the All Wilderness Alternative.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under partial wilderness designation, there could be slight losses in local income and

Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is moderate (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed; however, designation would preclude new leases and claims from being established in the WSA. New leases and claims could be developed in the 5,730-acre nondesignated portion. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$3,380 of livestock sales, including \$845 of ranchers' return to labor and investment. Proposed developments for livestock would be foregone along with any resulting increase in ranchers' income. Ninety-nine acres of vegetation treatment have been proposed.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide).

The loss of presently and potentially leased acreage could cause an eventual loss up to \$56,559 amount of revenue per year from lease fees to the Federal Treasury. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone.

If the proposed range developments are not developed and used, an estimated annual \$18 of Federal grazing revenues from 13 increased AUMs would be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increase. There are presently no commercial outfitters using the WSA; however, designation could lead to commercial recreational use in the WSA.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Emery County Board of Commissioners. 1984. *Zoning Resolution of Emery County*. January 1984. Castle Dale, Utah.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah" (unpublished document). Cambridge, Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1979. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.

TURTLE CANYON WSA

- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1982c. "Price River Resource Area Unit Resource Analysis" (unpublished document). December 1982. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1983. "Price River Resource Area Management Framework Plan" (unpublished document). September 1983. Price River Resource Area, Price, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1984. *Sunnyside Combined Hydrocarbon Lease Conversion Final Environmental Impact Statement*. August 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). April 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January 1982. U.S. Government Printing Office, Washington D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Recreation Plan, 1980 SCORP*. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.
- Welsh. 1979. *Illustrated Manual of Proposed Endangered and Threatened Plants of Utah*. U.S. Department of the Interior, Fish and Wildlife Service and Bureau of Land Management; U.S. Department of Agriculture, Forest Service. U.S. Government Printing Office, Washington, D.C. 317 pp.

Floy Canyon WSA



FLOY CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	3
Alternatives Considered and Eliminated from Detailed Study	3
Alternatives Analyzed	4
No Action Alternative	4
All Wilderness Alternative	7
Partial Wilderness Alternative (Proposed Action)	8
Summary of Environmental Consequences	13
AFFECTED ENVIRONMENT	13
Air Quality	13
Geology	13
Soils	14
Vegetation	14
Water Resources	15
Mineral and Energy Resources	15
Wildlife	18
Forest Resources	19
Livestock and Wild Horses/Burros	19
Visual Resources	20
Cultural Resources	20
Recreation	21
Wilderness Values	21
Land Use Plans and Controls	23
Socioeconomics	24
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	26
Analysis Assumptions and Guidelines for All Alternatives	26
No Action Alternative (Proposed Action)	26
All Wilderness Alternative	30
Partial Wilderness Alternative (Proposed Action)	34
BIBLIOGRAPHY	41

FLOY CANYON WSA (UT-060-068B)

INTRODUCTION

General Description of the Area

Floy Canyon Wilderness Study Area (WSA) is located entirely in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs in north-central Grand County, Utah. It contains approximately 72,605 acres of BLM-administered lands. Within the WSA boundary are eight sections of State lands totaling 5,788.61 acres and one 160-acre parcel of private land. The WSA is of irregular configuration, roughly 21 miles east to west and 11 miles north to south at its widest point.

The WSA is about 4 miles north of Interstate Highway 70 (I-70) between the towns of Thompson and Green River. Green River is approximately 9 air miles away, and Thompson is approximately 3 air miles away from the WSA. Elevations range from 9,496 feet along the northern part of the WSA to 5,000 feet at the mouth of Floy Canyon in the southern part of the WSA. The WSA has a semiarid high desert climate. Average annual precipitation ranges from 8 to 15 inches, and average growing season precipitation is 4 to 7 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F. Vegetation is predominantly pinyon-juniper, with large areas of Douglas fir as well.

Floy Canyon is part of a group of seven contiguous WSAs..

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the Grand Resource Area are discussed in Volume I. Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in analyses for individual WSAs.

Fifteen specific issues pertaining to the Floy Canyon WSA were identified through formal public scoping (USDl, BLM, 1984a) and are responded to below:

1. *Comment:* The Partial Wilderness Alternative excludes too much area. The coal resources in the northern part of the WSA could be mined by underground methods.

Response: A 25,540-acre area of known recoverable coal has been identified in the southern portion of the WSA. Because of this identified resource, a Partial Wilderness Alternative was developed to exclude mineral development conflicts that could occur even if the coal were developed through underground mining.

2. *Comment:* Cost/benefit analyses are needed to identify wilderness economic trade-offs.

Response: Economic impacts are discussed for each alternative. BLM does not believe that a cost/benefit analysis or any other comparison based solely on economic considerations can properly portray tradeoffs involved. This is because: (1) many of the values related to wilderness are intangible; (2) market conditions that affect consumptive resources are highly variable over time; (3) the wilderness study criteria do not lend themselves to cost/benefit interpretations; and (4) the numerous and divergent factors that contribute to wilderness considerations would make a meaningful cost/benefit analysis very difficult, if not impossible. BLM believes that it can serve best by narrating the situation and offering a recommendation that can be pursued in the political and legislative forums.

3. *Comment:* If motorized travel were prohibited, why does the Site-Specific Analysis (SSA) state that travel on ways would affect solitude?

Response: About 24 miles of existing ways are available for vehicular use. Even with wilderness conditions that prohibit motorized



FLOY CANYON WSA

travel, some vehicular access could occur if associated with use rights in effect prior to wilderness designation. In such cases, solitude would be affected. The impacts created by designation or nondesignation are discussed under the All Wilderness and No Action Alternatives, where motorized travel is considered closed or open.

4. *Comment:* What local economic effects would wilderness designation create?

Response: Economic impacts from wilderness designation would result primarily from loss of oil and gas lease revenues and potential energy/mineral development foregone. These are discussed in the All Wilderness Alternative, Environmental Consequences section.

5. *Comment:* Use of lost lease royalties to justify an unsuitable recommendation is an argument for not designating wilderness anywhere.

Response: During scoping for this Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Volume I Chapter 2 of this EIS. Trade-offs with potential energy and mineral development, including lease revenues and royalties, are included in the considerations.

6. *Comment:* The favorability for coal (medium to high) and oil and gas (low to medium) is outweighed by the wilderness values.

Response: Both mineral and wilderness values are discussed in the Affected Environment section, and impacts to mineral and wilderness values from wilderness designation and nondesignation are discussed in the Environmental Consequences section. Refer to the response to Comment 5 for information on how this analysis will be used to help determine the wilderness suitability recommendation for the area.

7. *Comment:* What is the oil, gas, coal, and uranium potential and what is the effect of wilderness designation on the development of oil and gas leases?

Response: As discussed in the Mineral and Energy Resources sections, the potential recoverable mineral resources are estimated as follows: less than 3 million barrels of oil and 18 billion cubic feet of natural gas; 71 million tons of coal; and less than 375 tons of uranium oxide. With wilderness designation, existing leases could be developed under original lease terms but would not be reissued after expiration. Leases with production as part of a unit would continue. No new leases would be issued. The opportunity to recover most of the leasable mineral values likely would be foregone. No coal leases would be issued and recovery of the coal resource would be foregone. The area would be withdrawn from future mineral location; therefore, unless uranium in the area is within existing claims, the future opportunity to recover the uranium resource also would be foregone.

8. *Comment:* The WSA possesses a good possibility for limited oil and gas production; therefore, it should be recommended as unsuitable.

Response: Refer to the response for Comment 5.

9. *Comment:* Are the roadless areas in the Book Cliffs the best producers of oil and gas in Utah? They are the best wildlife habitat.

Response: The WSA's value for oil and gas resources and wildlife habitat are discussed in the Affected Environment, Mineral and Energy Resources and Wildlife sections. A statewide analysis for these resources is presented in Volume I. Production in the southern part of the Uinta Basin and associated Book Cliffs primarily is for natural gas. Production varies from well to well, but the

region generally is considered a very good producer.

10. *Comment:* Land use conflicts resulting from wilderness designation are very important in this WSA.

Response: It is true that several very important trade-offs among resource values and land uses must be considered for this WSA.

11. *Comment:* Mineral resources, particularly oil and gas, are overplayed and wildlife and wilderness values underplayed.

Response: Mineral, wildlife, and wilderness values and the impact that wilderness designation and nondesignation would have on these resources have been addressed in this document. All resources have been treated in an objective manner, based on the best information available.

12. *Comment:* What impact on designation recommendations would inadvertently impairing developments (i.e., road construction/improvements) have in Floy Canyon (right fork of Tusher Canyon)?

Response: None. The right fork of the Tusher Canyon road is the northern boundary of the WSA. If the WSA is designated, a Wilderness Management Plan would be developed. It is assumed in the plan that a maintenance-and-use border would be allowed for roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface. According to policy, inadvertent impairments in WSAs require restoration to substantially natural conditions, except in unusual cases.

13. *Comment:* The analysis should consider minerals and other resources outside the WSA and the impact of lost lease royalties on local socioeconomics.

Response: The impact analysis focuses on resources both inside and outside of the WSA that would be affected by the alternatives. The loss of lease revenues and potential royalties is discussed in the socioeconomic impact analysis of the All Wilderness Alternative.

14. *Comment:* The SSA maintains that pre-FLPMA (Federal Land Policy and Management Act) leases with valid existing rights could impair wilderness values and create manageability problems. However, the

recommended partial alternative includes the majority of those leases.

Response: The Partial Wilderness Alternative was developed to resolve potential wilderness conflicts with the coal resource. Pre-FLPMA oil and gas leases do occur in the Partial Wilderness Alternative, and possibly could be developed inasmuch as there is surrounding oil and gas development.

15. *Comment:* The BLM notes in the SSA that wildlife, particularly elk, bear, and cougar, is found in the WSA because of the lack of human impacts. However, the SSA notes impacts to wildlife habitat would be mitigated. The mineral resources, particularly oil and gas, are overplayed while the wildlife and wilderness values are underplayed.

Response: Refer to the responses given in Comment 11.

16. *Comment:* The oil and gas potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

During scoping, it was suggested that the acreage included in the Partial Wilderness Alternative be enlarged. The coal resource was the principal reason for development of the present Partial Wilderness Alternative. To expand the acreage of this alternative to the south would overlap the coal resource, resulting in expanded resource conflicts; therefore, a larger partial alternative was not included for detailed study.

FLOY CANYON WSA

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (72,605 acres); and (3) Partial Wilderness (23,140 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

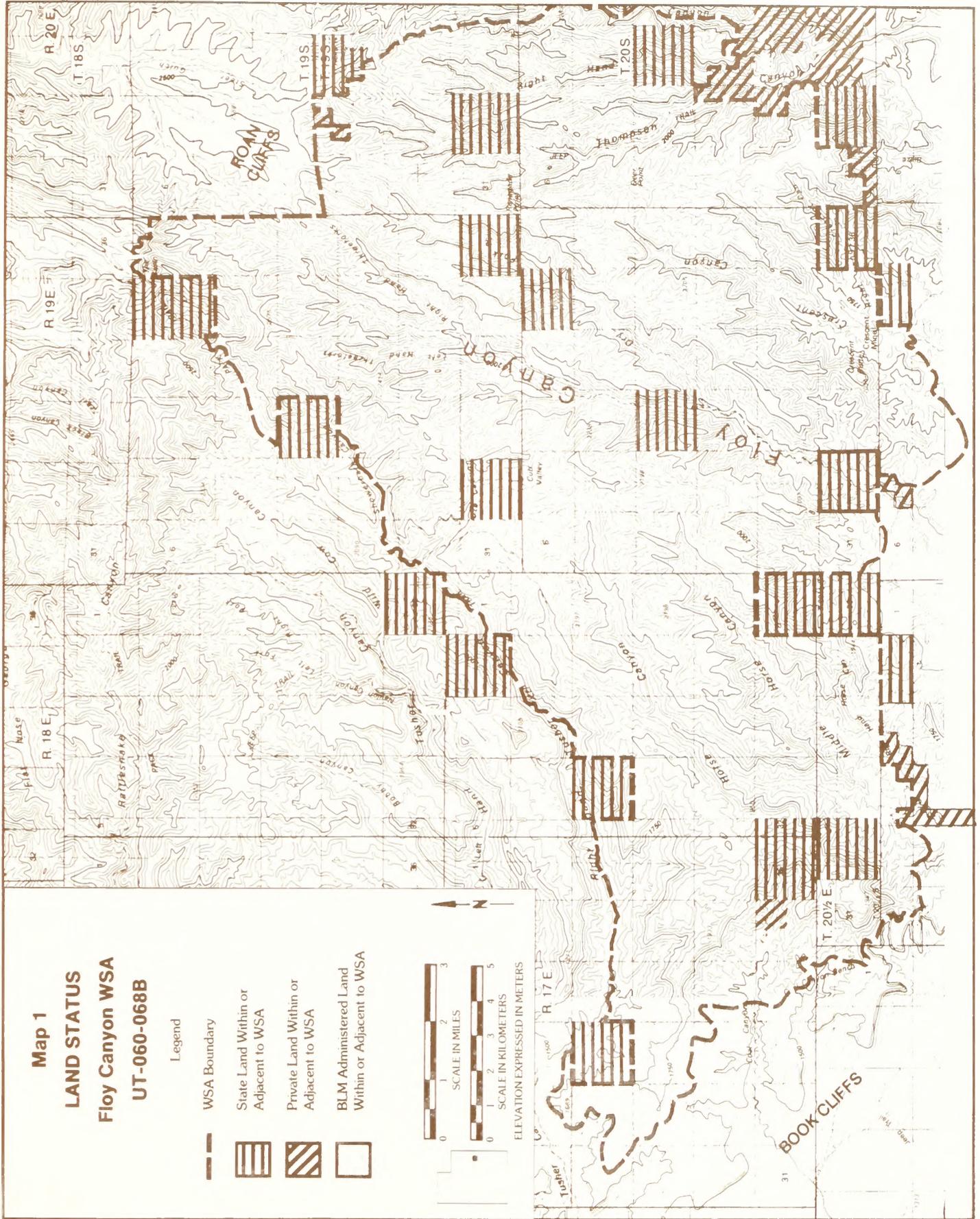
NO ACTION ALTERNATIVE

With this alternative, none of the 72,605-acre Floy Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Grand Resource Management Plan (RMP) (USDI, BLM, 1983). The State and private lands within or adjacent to the WSA (refer to Map 1) have not been identified for special Federal acquisition through exchange or purchase; therefore, these lands are analyzed as remaining under existing State and private ownership.

The following are specific actions that would take place under this alternative:

- The existing withdrawal would continue on 5,760 acres and the other 72,605 acres would remain open to mineral location, leasing with standard and special lease stipulations, and sale. Development work, extraction, and patenting would be allowed on four existing mining claims (about 640 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809) without concern for wilderness values. Existing oil and gas leases on 32,434 acres could be developed under leasing Category 1 (standard stipulations). Future leases could be developed under leasing Category 2 (standard and special stipulations) on 40,171 acres (and/or on other lands in the WSA where existing leases may expire) without concern for wilderness values. The special stipulations would restrict oil and gas activities during the winter to protect critical watershed and elk habitat.
- The present level of domestic livestock grazing use of the 72,605-acre WSA would continue as authorized in the Grand RMP (2,825 Animal Unit Months [AUMs]). The existing developments (15 drift fences, one corral, four developed springs, and two stock ponds) could be maintained in a routine manner, with motorized equipment if needed. Although none are now proposed except for the controlled burning project noted below, new rangeland developments could be implemented without wilderness considerations. Adjustments in season of grazing use and other livestock manipulation techniques are planned, including an increase of 113 AUMs of forage from the proposed burning project.
- Developments for wildlife, watershed, water resources, etc., would be allowed without concern for wilderness values if in conformance with the Grand RMP. The potential exists for an undetermined amount of watershed treatments in two locations and for about 905 acres of controlled burning in Floy Canyon and Tom Farrer Valley. Planned in-stream drop structures would be allowed in Floy and Thompson Canyons. Future introduction of bighorn sheep would be allowed if proposed by the Utah Division of Wildlife Resources (UDWR).
- The 72,605 acres, including several traveled ways (about 24 miles), would remain open for vehicular use. New access in the WSA could be developed without wilderness considerations, although none now is planned.
- The entire 72,605-acre area would continue to be potentially open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned due to inaccessibility, terrain limitations, and slow tree growth.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (changes not visually evident) on 67,525 acres, and Class IV (changes evident but visually integrated) on 5,080 acres.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.

FLOY CANYON WSA



Map 1

LAND STATUS Floy Canyon WSA UT-060-068B

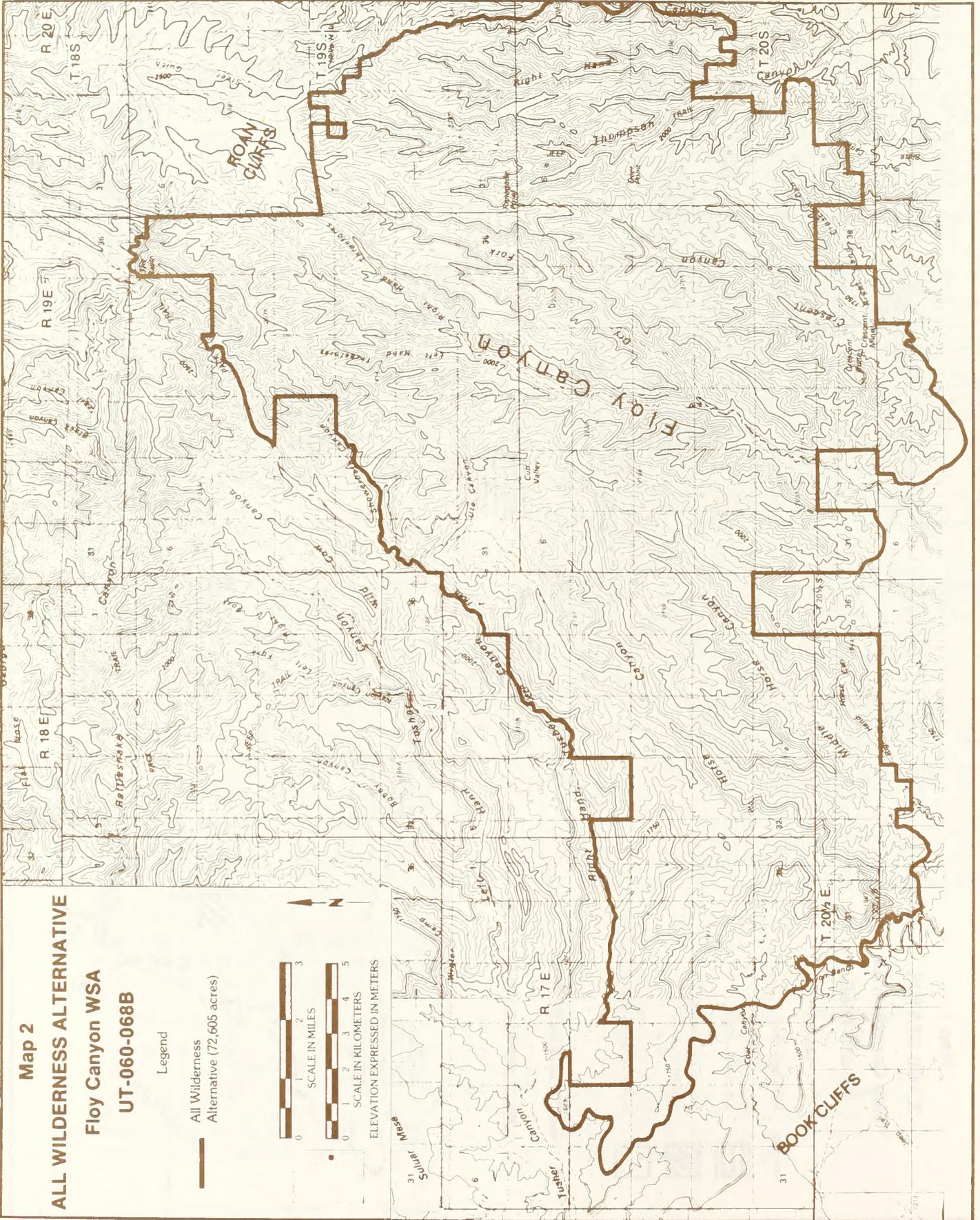
Legend

-  WSA Boundary
-  State Land Within or Adjacent to WSA
-  Private Land Within or Adjacent to WSA
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS

FLOY CANYON WSA



Map 2

ALL WILDERNESS ALTERNATIVE

Floy Canyon WSA

UT-060-068B

Legend

— All Wilderness Alternative (72,605 acres)



SCALE IN MILES



SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS

- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

With this alternative, all 72,605 acres of the Floy Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character. After designation, exchange of about eight sections (5,148.61 acres) of State land within the WSA and six State sections (3,873.48 acres) adjacent to the WSA (refer to Map 1) is likely, as requested by the State. (Refer to Volume I for further information regarding State in-holdings.) Seven State sections and six private parcels of land adjacent to the WSA likely would not be acquired by purchase or exchange. One quarter section (160 acres) of private land in Coal Canyon and no split estate lands are located within the WSA. It is assumed that the private in-holding would not be acquired by BLM. The figures and acreages given under this alternative are for Federal lands only.

The following are specific actions that would be taken with this alternative:

- After wilderness designation, all 72,605 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the four existing mining claims (640 acres) and any new mining claims located on 66,845 acres prior to wilderness designation that may be determined to be valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with concern for wilderness values. Existing oil and gas leases involving the 32,434 acres would be phased out upon expiration unless a find of oil or gas resources in commercial quantities is shown. No new oil and gas leases would be issued.
- Present domestic livestock grazing would be allowed to continue as authorized in the

Grand RMP. The 2,825 AUMs in the WSA would remain available to livestock as presently allotted. After designation, existing livestock facilities, as listed under the No Action Alternative, could be maintained as in the past, based on practical necessity and reasonableness. Although additional facilities are not now proposed, new rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that wilderness protection standards are met (refer to Appendix 1). It is assumed that the potential 905-acre burning-and-seeding project likely would not be allowed.

- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). Proposed in-stream drop structures in Floy and Thompson Canyons and potential watershed treatments in two locations likely would not be allowed unless carried out using native materials and by hand methods.
- Wildlife transplants and developments would be allowed (none now exist or are proposed) as long as criteria (refer to Appendix 1) are met to adequately protect wilderness values.
- The entire 72,605-acre area would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 24 miles of existing vehicular ways would not be available for vehicular use except as indicated above. Limited road access to the 160-acre private land in-holding would be allowed, as required. An existing road would be "cherry-stemmed" for about 2 miles in Floy Canyon. About 16 miles of the WSA boundary follow existing dirt roads and jeep trails that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 72,605-acre wilderness. As part of that plan, it is assumed that a

FLOY CANYON WSA

maintenance-and-use border would be allowed for roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.

- Harvest of forest products would not be allowed except for noncommercial harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 72,605 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 72,605-acre area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the 72,605-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures.
- Hunting without use of vehicles would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A

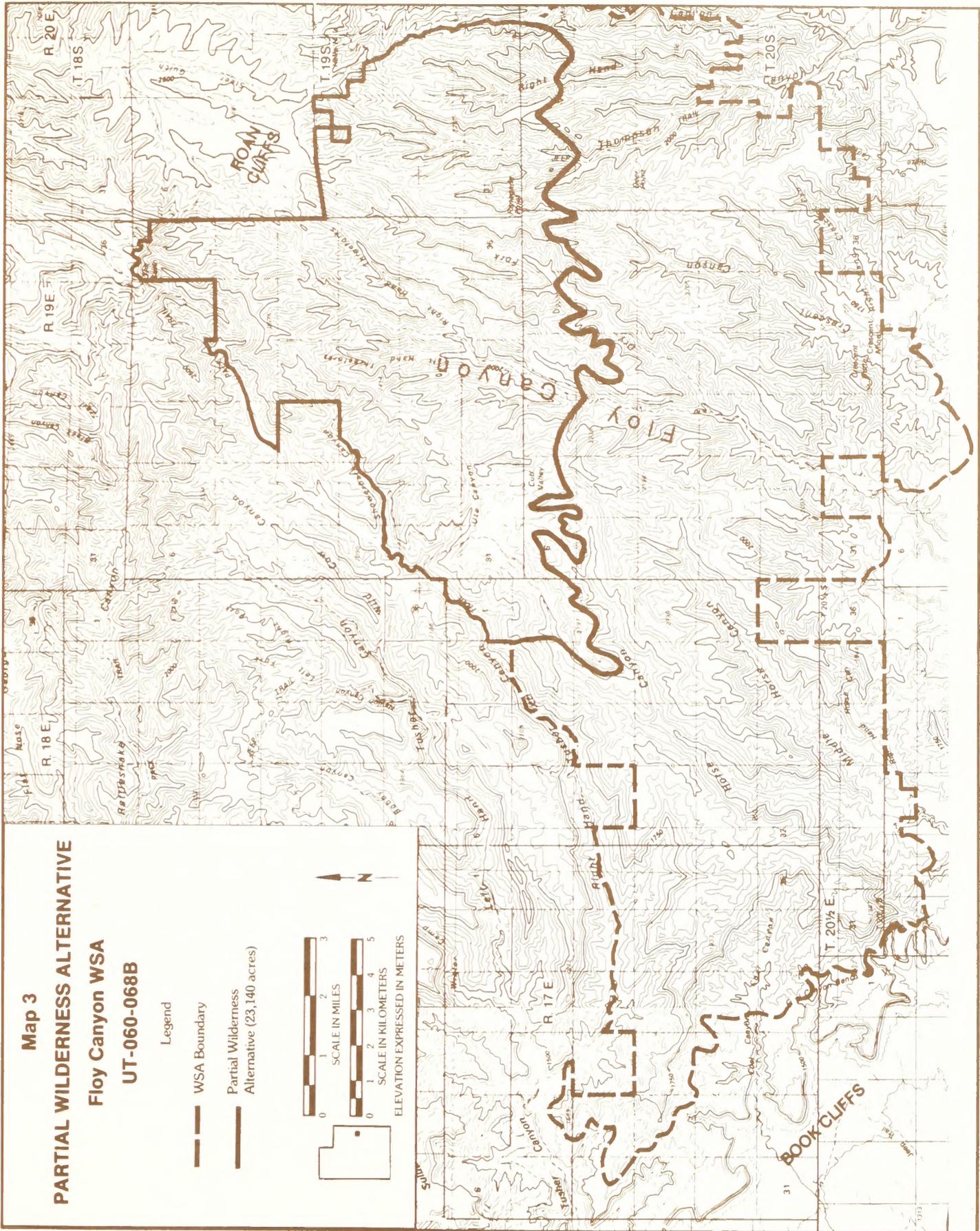
predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

With this alternative, 23,140 acres of the Floy Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA that would minimize or avoid areas of greatest mineral development potential (known coal resource). The area analyzed as wilderness includes the northern one-third of the WSA. The southern portion, comprising about two-thirds (49,465 acres) of the area within the WSA but outside of that designated as wilderness, would be managed in accordance with the Grand RMP, as described for the No Action Alternative. The 23,140-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative. Four sections (2,468.45 acres) of State land within the Partial Wilderness Alternative likely would be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Alternative are the same as described for the All Wilderness Alternative (refer to Volume I). Private land would not be involved. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows:

- The 23,140-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. In the 23,140-acre area, 5,760 acres would continue to remain closed and development work, extraction, and patenting would be allowed to continue on any new mining claims located on 17,380 acres prior to wilderness designation, provided that they are valid. The existing oil and gas leases that cover 14,230 acres would be phased out upon expiration unless a find in commercial quantities of oil or gas is shown. The 49,465-acre area within the WSA not designated wilderness would be open to future mineral location, leasing, and sale. In the 49,465-acre area, development work, extraction, and patenting of existing mining claims (640 acres) and future mining claims could occur without wilderness consideration if claims are valid. The area



Map 3

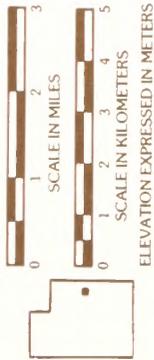
PARTIAL WILDERNESS ALTERNATIVE

Floy Canyon WSA

UT-060-068B

Legend

-  WSA Boundary
-  Partial Wilderness Alternative (23,140 acres)



not designated wilderness would be managed as oil and gas leasing Category 2 (standard and special stipulations) on the entire 49,465 acres. Future coal leasing could be considered in this area.

- Domestic livestock grazing would continue to occur in the 23,140-acre wilderness area. The 890 AUMs in the 23,140-acre area would remain available to livestock as presently allotted, and the existing livestock facilities in the area (drift fences and three developed springs) could be maintained, based on necessity and reasonableness. New rangeland developments could be allowed in the wilderness area if necessary for protection and management of the rangeland and/or wilderness resource, provided that wilderness protection standards are met. No new livestock developments other than the potential burning project are planned. It is assumed that about 77 percent (700 acres) of the 905-acre burning project would not be allowed. In the 49,465-acre nonwilderness area, grazing use would be allowed if in conformance with the proposed RMP (currently 1,935 AUMs) and existing developments (drift fences, two reservoirs, one corral, and one spring) could be maintained as at present. New rangeland developments (none now proposed other than the controlled burning project) could be allowed in this area without concern for wilderness values. About 23 percent (205 acres) of the potential 905-acre burning project would be allowed.
- In the 23,140-acre wilderness, new water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed only if enhancing to wilderness, if necessary to correct conditions imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In-stream drop structures would not be allowed in the wilderness area. In the remaining 49,465-acre area, water resource facilities would be allowed without concern for wilderness values if in accordance with the RMP. In-stream drop structures would be allowed in this area.
- In the 23,140-acre wilderness, wildlife transplants or habitat improvements would be allowed only if they were compatible with wilderness values. In the remaining 49,465-acre area, wildlife transplants or

improvements would be allowed without wilderness limitations. No wildlife projects are now proposed in either part of the WSA.

- The entire 23,140-acre wilderness would be closed to ORV use. About 11 miles of existing vehicular ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the unit, including about 13 miles of ways, would remain open to vehicular travel. About 6 miles of dirt roads and jeep trails that border the land in the Partial Wilderness area would remain open to vehicles. The existing 2 miles of road in Floy Canyon would be in the undesignated part of the WSA and, therefore, would not be "cherry-stemmed."
- A specific Wilderness Management Plan would be developed to govern use and protection of the 23,140-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the 23,140-acre wilderness would not be allowed except for noncommercial harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 49,465 acres would be open to woodland harvest, although none is planned.
- Visual resources in the 23,140-acre wilderness would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change. The nondesignated area would be managed as Class II (changes not visually evident) on 4,385 acres and Class IV (changes evident but usually integrated) on 5,080 acres.
- Within the 23,140-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness

FLOY CANYON WSA

TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
FLOY CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (72,605 Acres)	Partial Wilderness Designation (23,140 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is moderate to low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 71 million tons of coal, and 500 tons of uranium oxide.	Up to 0.5 million barrels of oil and 3.2 billion cubic feet of natural gas could be recovered from unitized leases. The remainder of the potential oil and gas would be foregone. Coal likely would not be recovered. Also, it is likely that uranium recovery would also be foregone. Due to the moderate to low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant in the foreseeable future, but could be important in the long term.	Although likelihood is moderate to low, up to 2 million barrels of oil, 12 billion cubic feet of natural gas, 48 million tons of coal, and 340 tons of uranium oxide could be recovered. About 1 million barrels of oil, 6 billion cubic feet of gas, 23 million tons of coal and 160 tons of uranium oxide would be foregone. This alternative would favor future production of coal in the WSA.
Wildlife	About 2 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.	Wildlife in the designated area would benefit from solitude. About 2 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat.
Livestock	Grazing of 2,825 AUMs and maintenance of existing developments would continue. A proposed 905-acre land treatment could be implemented.	Grazing of 2,825 AUMs and maintenance of existing developments would continue. Little effect on existing grazing management is expected. Proposed new developments might not be allowed, and the 905-acre land treatment would not be carried out.	Grazing of 2,825 AUMs and maintenance of existing developments would continue. A total of 205 acres of the land treatment could be implemented in the undesignated portion, while 700 acres would not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 2,355 acres.	Visual quality could be impaired on 49 acres.	Visual quality could be impaired on 1,198 acres, including 6 acres in the designated portion. About 34 percent of the Class A scenery would be within the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use could continue on 24 miles of ways. Overall recreational use could increase from the present 200 visitor days per year to 298 over the next 20 years. Up to 2,355 acres of mineral-related development and land treatments could reduce the quality of primitive recreation.	The WSA, including 24 miles of ways, would be closed to ORV use. Recreational use could increase to up to 7,261 visitor days per year over the next 20 years due to publicity associated with wilderness designation.	ORV recreational use could continue on 13 miles of ways in the undesignated portion. Overall recreational use could increase to up to 2,314 visitor days per year over the next 20 years.

FLOY CANYON WSA

**TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
FLOY CANYON WSA**

Resource	Alternatives		
	No Action	All Wilderness (72,605 Acres)	Partial Wilderness Designation (23,140 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 2,355 acres (3 percent of the WSA), but the rest of the WSA would not be affected, unless roads from energy and mineral development are extended through the WSA.	Wilderness values would be protected, except on up to 49 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.	In the designated portion, wilderness values would be protected, except on 6 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on up to 2.4 percent of the 49,465 acres not designated. Overall, wilderness values could be lost on 1.6 percent of the WSA. About 32 percent of the area meeting the standards for naturalness and outstanding opportunities for primitive recreation and 34 percent of the area meeting the standards for outstanding opportunities for solitude would be in the designated portion and would be protected by the reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Grand County Master Plan</i> , State of Utah plans and policies, and the current BLM Grand RMP.	This alternative would conflict with Grand County's concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the Grand RMP.	Partial designation would be the same as for the All Wilderness Alternative, except that the portion not designated would be consistent with Grand County's concept of multiple use.
Socio-economics	Annual local sales of less than \$57,720 and Federal revenues of up to \$101,257 would continue. An additional \$120,513 per year in Federal revenues could be derived from leasing of presently unleased areas, and \$2,260 in local economic benefits and \$168 in Federal grazing revenues could be derived as a result of additional AUMs available from land treatments.	Annual local sales of less than \$57,720 would continue. Existing Federal revenues of up to \$101,257 would be lost and \$120,513 in potential Federal revenues from mineral leasing, \$2,260 in local benefits from grazing, and \$168 in potential additional Federal grazing revenues would be foregone. The opportunity for local income from future energy and mineral developments would be reduced in the WSA.	The effects of this alternative would be similar to the All Wilderness Alternative, except that annual Federal revenues up to \$53,805 in existing lease fees would be lost and \$15,615 from potential lease fees would be foregone. Additional AUMs from land treatments could result in \$540 in local economic benefits and an additional \$38 in Federal grazing revenues.

values (i. e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques. In the 49,465-acre nonwilderness area, measures of control would be taken without wilderness considerations.

- In the 49,465-acre nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 23,140-acre wilderness, such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the 49,465-acre area, hunting would be allowed subject to applicable State and Federal laws and regulations. In the 23,140-acre wilderness, hunting would be allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means.
- In the 49,465-acre area, control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious loss of domestic livestock. In the 23,140-acre wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences that would result from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the Grand RMP and other BLM documents and files.

Air Quality

The WSA has a Prevention of Significant Deterioration (PSD) Class II air quality classification, as per the 1977 Clean Air Act amendments. The nearest Class I area is Arches National Park, about 12 air miles southeast. Canyonlands National Park, another Class I area, is about 40 air miles to the south. No significant sources of air pollution are close enough to affect the WSA. Visibility from higher elevations of the WSA averages 30 to 100 miles and is important because of scenic vistas from the WSA across the Book Cliffs.

Geology

The WSA is in the Book Cliffs, a physiographic feature which runs from east of Grand Junction, Colorado to the northwest of Green River, Utah. It is part of the Uinta Basin Section of the Colorado Plateau Physiographic Province. Floy Canyon WSA is entirely in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by many drainages.

Elevations range from 9,496 feet along the northern part of the WSA to 5,000 feet at the mouth of Floy Canyon in the southern end of the WSA. The 400-foot-high face of the lower Book Cliffs, visible for miles from I-70, occurs just south of the WSA. The 1,000-foot cliff of the upper Book Cliff escarpment forms the southern boundary of the WSA.

The WSA is along the south-facing Book Cliffs escarpment, with part extending northward towards the Roan Cliffs. It is underlain by sedimentary rocks of Cretaceous and Tertiary Age. Along the southeastern side of the WSA the Mancos Shale and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River Formations. In the northwestern part of the WSA, the oil-shale rich

FLOY CANYON WSA

Parachute Creek Member of the Green River Formation crops out in an irregular band (specifically, the Mahogany oil-shale bed). All strata in the vicinity of the WSA dip gently northward to the Uinta Basin.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Cedar Mountain, Entrada, and Navajo. The Morrison and Chinle Formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth, but indications are that ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation.

Differential erosion of the layers of sandstones and shales has created the distinctive "banded" appearance characteristic of the Book Cliffs. In the higher elevations towards the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Soils

The Floy Canyon WSA is characterized by steep canyons. About 30 percent of the area is composed of moderately deep and deep loamy soils on steep canyon sides and mountain sides. About 20 percent is composed of shallow and deep stony soils on steep canyon sides. About 20 percent is deep loamy soils on gently sloping alluvial fans and along drainages and canyon floors. About 10 percent are shallow loamy soils on sloping benches. About 20 percent of the area is composed of rock outcrop occurring as cliffs and ledges. Under present conditions, average soil loss from erosion is estimated at about .62 cubic yard/acre/year. Total annual soil loss for the entire WSA is approximately 45,015 cubic yards. Refer to Table 2 for soil characteristics and land types and Table 3 for erosion conditions in the WSA.

No agricultural activity takes place within the WSA. There are fields that have been farmed just outside the WSA in Thompson Canyon and producing farm fields within 2 miles of the western boundary (along the Green River). The great majority of the WSA is too steep and rocky to be farmed. Possibilities for agricultural development in the canyons are severely limited due to elevation, erodibility of soils, and potential for flash floods.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	20	14,521	0	0
Shallow and deep loamy soils on sloping cuestas and structural benches	10	7,261	1	5
Shallow and deep stony soils on steep canyon sides	20	14,521	1	10
Moderately deep and deep loamy soils on steep mountain sides	30	21,781	1	20
Deep loamy soils and gently sloping alluvial fans and floodplains	20	14,521	0.1	1
Totals	100	72,605		

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions		Annual Soil Loss if Disturbed		
		Percent of Area	Cubic Acres	Percent of Area	Cubic Acres	
Very High	20	—	—	30	21,781	435,620
High	10	—	—	20	14,521	145,210
Medium	5	—	—	10	7,261	36,305
Low	1	60	43,563	20	14,521	14,521
Very Low	0.1	20	14,521	—	—	—
None	0	20	14,521	20	14,521	0
Totals		100	72,605	100	72,605	631,656 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: .62 under present conditions; 8.70 if disturbed.

Vegetation

Existing vegetation is predominantly pinyon-juniper of varying density. The WSA is very broken topographically with many ridgelines showing different vegetative aspects on either side due to directional exposure (e.g., north-facing, south-facing, etc.)

In the upper elevations, mountain shrub vegetation types are found. High desert plant communities occupy the lower elevations. Major plant species found throughout the WSA include Douglas fir, aspen, western wheatgrass, Gambel's oak, mountain mahogany, big sagebrush, serviceberry, pinyon pine, Utah juniper, salina wildrye,

galleta grass, and shadscale. Cottonwood and willow riparian areas are associated with the WSA's springs and intermittent and perennial streams. Intermixed with the types listed in the table, riparian vegetation occurs in less than 5 percent of the WSA. Table 4 indicates existing vegetation types within the WSA.

The WSA is entirely in the Colorado Plateau Physiographic Province Ecoregion as shown on the Bailey Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

There are no known sensitive, threatened, or endangered plant species within the WSA.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir	26,495	37
Pinyon-juniper	30,080	41
Salina wildrye	9,440	13
Shadscale	6,590	9
Totals	72,605	100

Source: USDI, BLM, 1972.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Douglas fir forest	7,680	11
Mt. Mahogany-oak scrub	18,480	25
Pinyon-juniper woodland	44,525	61
Saltbush-greasewood	1,920	3
Total	72,605	100

Source: USDI, Geological Survey, 1978.

Water Resources

The major drainages in the WSA are Tusher, Coal, Horse, Floy, Dry, Crescent, Thompson, and Segó Canyons. All drainages flow in a southerly to southwesterly direction out of the Book Cliffs to the Green River. Tusher Canyon borders the northwest boundary of the WSA and Segó

Canyon borders the WSA boundary on the east. Floy Wash is the only perennial water course (approximately 8 miles) in the WSA; all others are intermittent. Floy Wash headwaters are located on the west side of the drainage divide of the Green and Colorado Rivers in the northeast corner of the WSA.

A water inventory of the WSA has revealed four developed springs and 82 undeveloped springs. There are no water wells in the WSA.

Since the highly saline Mancos Shale is exposed only in the lower reaches of the WSA, surface water quality, for the most part, is acceptable for recreation, wildlife, livestock, and agricultural uses.

Three of the major drainages in the WSA (i.e., Floy, Dry, and Thompson) have been identified as areas damaged by floods and contribute to sediment damage. These areas have been identified for potential watershed treatments (in-stream drop structures) to minimize downstream damage.

Mineral and Energy Resources

The WSA is in an area known for hydrocarbon potential including oil and gas, tar sand, and oil shale. The Book Cliffs are known to contain coal. Additionally, prospecting has occurred within the WSA for other minerals, including uranium.

The BLM, in coordination with the U.S. Department of Energy, had each WSA assessed for its energy and mineral resources by SAI (1982). (Refer to Appendix 5 for an explanation of the SAI rating system.) Table 6 presents a summary of the mineral and energy resources for the Floy Canyon WSA.

An overall importance rating (OIR) of 2+ was assigned to the Floy Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR applies to between 75 and 100 percent of the tract evaluated by SAI.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c3	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Oil Shale	f2	c4	Less than 15 barrels of shale oil/ton of shale
Uranium/Vanadium	f2	c2	Less than 500 tons of uranium oxide
Coal	f3	c4	143 million tons
Potash	f1	c3	None
Manganese	f1	c1	None
Copper	f1	c1	None
Geothermal	f1	c3	None
Hydropower	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA. The WSA could contain deposits of vanadium that is currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

The Floy Canyon WSA, as evaluated by SAI in 1982, is given a moderate certainty rating that oil and gas resources exist. The rating is a result of the proximity of other fields to the WSA. Several such fields occur in a concave, west-facing area about 10 miles east of the WSA.

Although the SAI team indicated that assignment of a favorability rating is more difficult, the area was given a low rating for oil and gas. The rating indicates potential for scattered small pools of oil and gas. Less than 10 million barrels of oil or less than 60 billion cubic feet of gas are estimated to be in-place. Of this, less than 18 billion cubic feet of gas or less than 3 million barrels of oil would be recoverable. The difficulty in assigning a rating stems from the relatively horizontal layering of the sedimentary strata in the WSA. Without structural traps there is likely to be little hydrocarbon accumulation.

The WSA is along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields producing from the Jurassic Entrada and Morrison Formations, and the Cretaceous Cedar Mountain and Dakota Formations. Numerous fields, some shut-in or abandoned, occur in an area surrounding the WSA. Approximately seven holes have been drilled for oil and gas exploration within 3 miles of the WSA: one gas producer occurs on the boundary of the WSA and five dry holes have been drilled on or near the WSA boundary.

Leasing and drilling activity in the vicinity of the WSA has been high. Some of the fields on the perimeter of the WSA include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields in the vicinity of the WSA are located 10 to 15 miles to the northeast. San Arroyo, the largest, has produced more than 60 billion cubic feet of gas. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 billion cubic feet of gas). Small structural traps are responsible for the production. The nearest oil and gas field is Blaze Canyon located a few miles to the south of the WSA. The estimated recoverable oil from Blaze Canyon is about 100,000 barrels (SAI, 1982).

A structural linement has been identified east of the WSA running on a northwest-southeast trend. This has been identified as an area of high oil and gas potential in Paleozoic rocks resulting from an ancient Uncompahgre fault zone. It is believed that the region south of this fault has the best potential for a large oil and gas discovery. This fault runs through the WSA.

The WSA contains all or portions of 21 oil and gas leases covering about 32,434 acres (45 percent of the area). Approximately 7,873 acres are covered by pre-FLPMA leases and 24,561 acres are covered by post-FLPMA leases (refer to Table 7).

FLOY CANYON WSA

TABLE 7
Oil and Gas Leasing

Type	Acres of WSA	Percent of WSA
Pre-FLPMA	7,873	11
Post-FLPMA	24,561	34
Available for Leasing	40,171	55
Total	72,605	100

Source: USDI, BLM, 1975.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

At least 13,173 acres of leases within the WSA are held by production. None of the producing wells are within the WSA but are part of leases with boundaries included both inside and outside the WSA, with producing wells outside of the WSA.

The area of the WSA was included in the "Moab District Oil and Gas Environmental Analysis Report" (USDI, BLM, 1975), which established oil and gas leasing categories to protect certain resource values. With this category system, all of the WSA was classified as open with standard stipulations (Category 1). However, in the Grand RMP the category was changed to Category 2 (standard and special stipulations) with special

stipulations restricting winter use to protect critical watershed and elk habitat.

The WSA has portions of one Known Geologic Structure (KGS), indicating the existence of a known oil and gas field. The KGS covers 693 acres or approximately 1 percent of the WSA. The WSA also contains part of one oil and gas unit agreement, the Rattlesnake Canyon Unit, an area of 5,300 acres. Unit agreements typically pool several oil and gas leases together into a unit. The effect of such an agreement is to make work on any one lease within the unit area apply to all leases. This affects requirements to extend leases. A well drilled outside a WSA but within a unit that straddled the boundary would convey lease extension rights to all leases within the unit, including those within the WSA. Within a unitized area the date of the lease is the controlling factor for rights conveyed, not the date of the unit. There is one unit in the WSA (5,300 acres), and it is post-FLPMA in date.

Oil Shale

According to SAI, the WSA has potential for oil shale. This is because oil shale is present in the Mahogany zone of the Parachute Creek Member of the Green River Formation. This unit extends into the northern part of the WSA. The Mahogany zone has been under development for shale oil production in the Grand Junction, Colorado, area, but extraction appears economically questionable at this time. SAI assigned the WSA a low favorability for oil shale. The rating indicates a potential for thin beds of oil shale, with a yield of less than 15 gallons of oil per ton of shale. However, upon BLM field examination, it was discovered that the geologic structure of the WSA is not suited to the occurrence of oil shale, and it is highly unlikely that any oil shale beds occur in the WSA. About 5,760 acres in the WSA are under an oil shale withdrawal.

Potash

The WSA has no potential for potash because it is far to the north of the Paradox Basin where potash-bearing salts were deposited.

Coal

The SAI rating for coal indicates that a moderate tonnage (estimated 143 million tons) could exist within the area. Of this, approximately 71 million tons are considered recoverable. Almost all of the WSA is within the Segó Coal Field, as defined by SAI (1982). The coal is present in several discrete strata in the Cretaceous Mesa Verde Formation. Reserves for the entire Segó Field in beds 4 feet thick and greater total an estimated 294 million

tons, or less than 5 percent of Utah's total coal. Active coal mining began in 1912 and the last activity was in the early 1950s in the Se-go Field. Most of the 2.7 million tons of coal produced came from the Ballard Mine near Thompson and Se-go Canyons located southeast of the WSA. Coal in the Thompson area is reported to be high bituminous with over 11,000 British thermal units (BTUs)/pound, comparable with the best coal in Utah (USDI, BLM, 1984b). Hundreds of coal sections have been measured in and around the WSA, and these indicate that coal beds are relatively thick in this part of the Se-go Field. Many coal beds exceed a thickness of 4 feet, particularly between Nash and Se-go Canyons southeast of the WSA. Many of the beds, however, thin rapidly along the outcrop, and many are apparently impure. Most of the coal reserves attributed to the Se-go Field are located along the southeast side of the WSA (SAI, 1982).

A known recoverable coal resource area (KRCRA) of approximately 25,540 acres has been identified by the USDI, Geological Survey (1977) within the southern portion of the WSA. Renewed interest in development of coal resources present in Thompson Canyon (private land) has recently been expressed by two companies. The coal resource has not been made available for leasing; therefore, there are no coal leases within the WSA. The potential for the coal to be developed in the foreseeable future is questionable due to its varying quality with better, more assessable coal found in the vicinity but outside of the WSA. The coal resource in the WSA could be extracted in the long-term future.

LOCATABLE MINERALS

The WSA has been rated by SAI as having a low potential for uranium/vanadium and negligible potential for other hard rock minerals. The 5,760 acres in the WSA under oil shale withdrawal are closed to mining claim location.

Uranium

The WSA has potential for less than 500 tons of uranium oxide in a geologic environment only marginally favorable for the resource to occur. The certainty of uranium occurrence is based on the scattered occurrences in nearby areas. The nearest uranium deposits are about 10 miles south along an outcrop of the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, another major uranium-producing zone regionally, lies an additional 600 feet below the Morrison. Both are too deep to be

considered favorable for production. There are no uranium claims in the WSA.

Gold

Although gold may be present in microscopic amounts in a few places in the WSA, gold was not rated by SAI. Four placer mining claims covering 640 acres are present in the WSA. None of the claims have been mined.

Wildlife

The Floy Canyon WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, cougar, coyote, bobcat, blue grouse, ruffed grouse, chukar, and numerous species of raptors, songbirds, small mammals, reptiles, and amphibians can be found throughout the area.

The major habitat types of the WSA include pinyon-juniper uplands and steep hillsides, Douglas fir hillsides, mountain brush hillsides, sagebrush, and aspen parks, aspen, willow, and cottonwood riparian bottoms and associated intermittent streams.

The Floy Canyon WSA supports moderate to high populations of big game species. Mule deer are the most common species. About 80 deer can be found in the area year-round, mostly in the riparian areas and high sagebrush parks. From November to March, about 420 deer can be found in the WSA. Elk can also be found yearlong in the high sagebrush parks and aspen communities. About 80 elk have been observed during summer flights over the WSA. The elk move freely between the Uintah-Ouray Indian Reservation and the WSA. About 60 elk winter in the WSA. Black bear and cougar are yearlong residents. Rocky Mountain bighorn sheep occasionally may drift into the WSA. Approximately 2,000 acres of the WSA have been identified by the Utah Division of Wildlife Resources (UDWR) and BLM as crucial year-round habitat and another 56,575 acres as crucial winter habitat for black bear, cougar, deer, and elk.

Mourning doves are common in the WSA during the summer-fall period. Nesting is common in sagebrush and pinyon-juniper uplands. Chukar partridge (an exotic species) may be found year-round along canyon bottoms where rocky slopes, water, and cheatgrass are abundant. Grouse are also found year-round in the WSA. Blue grouse and ruffed grouse can be found at the higher elevations in the Douglas fir and aspen habitat type and along the riparian areas. Sage grouse are most common at the higher elevations where sagebrush parks are present.

FLOY CANYON WSA

A few migratory ducks and shorebirds may be found on or near springs and intermittent streams. The most common birds in the WSA are blue jays, pinyon jays, white-crowned sparrows, juncos, swifts, swallows, kingbirds, kinglets, nuthatches, and magpies. Raptors common in the area are golden eagles, red-tailed hawks, kestrels, great-horned owls, goshawks, Copper's hawks, and sharp-shinned hawks.

Several species of reptiles and amphibians are found in the WSA. The most common are horned lizard, Great Basin sagebrush lizard, side-blotched lizard, whiptail lizard, gopher snake, striped whipsnake, and midget-faded rattlesnake. Amphibians are most common in the riparian habitat type. Red-spotted toads, Great Basin spadefoot toad, canyon tree frog and the Utah tiger salamander may be found in the WSA.

The Fish and Wildlife Service (FWS) has identified the WSA as having potential habitat for one endangered species (black-footed ferret) and four candidate species (ferruginous hawk, long-billed curlew, Southern spotted owl, and Western yellow-billed cuckoo). However, it has not been confirmed that these species are actually present in the WSA. The area may also be within the overall range of peregrine falcons and bald eagles.

The WSA is favorable for wildlife because of its rugged terrain, water availability, vegetation diversity, and lack of human intrusions. Four species present are very sensitive to human intrusion: black bear, cougar, elk, and mountain bighorn sheep. Remote and isolated conditions greatly enhance habitat favorability for these species.

There are no existing habitat improvements in the WSA, nor are any planned. There are no wildlife

transplants proposed, although UDWR is considering transplanting bighorn sheep into the WSA.

Forest Resources

Minimal forest production is known to have taken place within the WSA. Douglas fir was harvested in upper Thompson Canyon in the 1920s. Timber was used in neighboring Se-go Canyon associated with coal mining activities. Little, if any, current use is occurring. Even though timber species are present, the area is considered nonproductive because of inaccessibility, rugged terrain, and slow growth of trees (50 to 75 years to produce 1-inch trunk development of Douglas fir). Pinyon-juniper woodland in the area is generally incapable of yielding 20 cubic feet/acre of commercial wood per year. The area may be used to provide firewood or posts and could yield Christmas trees for local use. The 56,575 acres of pinyon-juniper and Douglas fir could supply 8,802 cords of firewood.

Livestock and Wild Horses/Burros

The WSA contains portions of nine grazing allotments involving nine operators. Refer to Table 8 for livestock grazing use data for the WSA.

Range developments within the WSA consist of 15 short drift fences, one corral, four developed springs, and two stock ponds. The potential exists for watershed treatments in Thompson Canyon and Floy Canyon and controlled burns in Tom Farrer Valley and Floy Canyon. Nine hundred and five acres for burning have been identified. An increase of 113 AUMs could be expected from this project.

TABLE 8
Livestock Grazing Use Data

Allotment	Class of Livestock	No. of Operators	Season of Use	Total Allot. AUMs	Total Allot. Acres	Acres in WSA	Percent of Allot. in WSA	AUMs in WSA
Lone Cone	Cattle	1	10/25-2/9	210	6,400	3,840	60	120
Coal Canyon	Cattle	1	5/1-4/30	401	3,840	2,240	58	233
Tusher Wash	Cattle	1	11/12-4/30	944	15,360	1,114	7	66
Horse Canyon	Cattle	1	11/12-4/30	1,008	45,420	13,566	30	302
Showerbath Spring	Cattle	1	6/1-10/24	601	42,880	10,194	24	144
Floy Creek	Sheep	1	11/15-4/20	1,208	22,400	6,118	27	326
Floy Canyon	Cattle	1	5/16-11/30	750	13,860	13,860	100	750
Crescent Canyon	Sheep	1	11/12-4/12	998	23,040	9,793	43	429
Thompson Canyon	Cattle	1	5/20-11/10	500	13,120	11,880	91	455
Totals		9		6,620	186,320	72,605		2,825

Sources: USDI, BLM, 1972 and 1983.

FLOY CANYON WSA

Some of the approximately 24 miles of vehicular ways in the WSA (particularly the route in Floy Canyon) are used occasionally by livestock operators. Overall, however, there is little current use of motorized vehicles for managing livestock in the WSA.

Wild horses or burros are not known to occupy the WSA.

Visual Resources

The WSA presents a landscape typical of the Book Cliffs. The steep slopes contain sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give an appearance of steps to the slopes noticeable some miles away. In the area of the Roan Cliffs in the northern half of the WSA, rock outcrops are reddish brown in color, as the name implies. Landforms are more dissected in the Roan Cliffs.

The WSA is classified as having 67,525 acres (93 percent) of Class A scenery and 5,080 acres (7 percent) of Class B scenery (Ray Mann Associates, Inc., 1977). Class A scenery contains the most outstanding characteristics of the physiographic region. Class B scenery combines some outstanding features and some features common to the region.

The WSA contains both medium (74 percent) and high (26 percent) sensitivity levels relative to the degree of user interest in visual resources and concern for changes in the existing landscape character. Based on these factors, 93 percent (67,525 acres) of the WSA is within a VRM Class II area and 7 percent (5,080 acres) is within a Class IV area. Class II accommodates changes not visually evident, while Class IV allows changes to be evident but visually integrated with the characteristic landscape. Additional information on BLM's VRM system can be found in Appendix 7.

Cultural Resources

A complete inventory for historic or prehistoric values in the WSA does not exist. Known historic and prehistoric remains represent a portion of the scientific and recreation values of Floy Canyon. The old Spanish Trail was a primary travel and trade route between New Mexico and California in the mid-19th century. The Gunnison Crossing on the trail is just to the west of the WSA. Early

outlaw history touched the vicinity with the activities of Butch Cassidy and the Wild Bunch around the turn of the century.

Evidence of early coal mining activities exists at Crescent Butte. Five other old mines are scattered through the WSA. Two log cabins are located in the WSA—one in right hand Thompson Canyon and one adjacent to Sego Canyon. Both are probably older than 50 years.

Evidence of early logging is visible in upper Thompson Canyon, with the remains of old stumps on the hillside and some timber on the ground that has been partially shaped by an ax. The Thompson Canyon vehicular route was supposedly constructed in the 1920s to bring out timber. A cattle trail continues up past the logging site to the head of the drainage. This trail reportedly had an octagon rifle barrel stuck into the top of a large rock as a landmark part way up the route. Also, a stock trail was constructed from the old homestead in Thompson Canyon up to Deer Point. Little evidence of this trail remains. Two prehistoric lithic scatters are recorded. No sites listed or nominated to the National Register of Historic Places are within the WSA.

It is estimated that an excess of 60 sites could be in the WSA, with 30 of these having National Register potential.

Cultures represented in the region include the Paleo-Indian, Desert Archaic, Fremont, Anasazi, Ute, and historic European.

The earliest human occupation of the region is by the Paleo-Indian big game hunters. They dated from about 5,500 to 10,000 B.C. and followed migrating herds of giant Pleistocene animals such as mammoths and bison antiquous. Over half the Paleo-Indian points found in Utah are from the Moab vicinity, and research may yield more in the WSA.

Archaic peoples are better represented in the region and possibly were more numerous. Evidence from their broad range of foraging pursuits is found in nonceramic open campsites and caves and rockshelters. Cave excavations at locations not in the Floy Canyon WSA show a long occupation from about 6,060 B.C. to A.D. 500, depending on interpretation.

The Formative or sedentary agricultural culture which followed took two forms: the Anasazi and the Fremont. The WSA occurs in the border area between these two groups, but large numbers of Fremont ceramics at the Turner-Look site just outside the WSA on the east edge suggest their

FLOY CANYON WSA

dominance in the area. Both Fremont and Anasazi cultures had ended in the area by about 1,300 A.D.

Evidence for the Ute nomadic foragers follows the end of the Formative cultures in the area. Sites consist of caves and open camps, as well as wickiup pole and brush structures.

European influence in the region dates from the Dominguez-Escalante Expedition of 1776, followed by Mexican traders on the Old Spanish Trail and French fur trappers in the 1810 through 1840 era. The latter are represented by an inscription by Antoine Robidoux, dating to 1837, located in Westwater Canyon to the east. American explorers crossed the region just south of the WSA in the 1850s just before the first Anglo-American settlement was also attempted at Moab. Permanent American settlement occurred in the late 1870s and early 1880s with ranching spreading to the WSA by that time. Use of the WSA was made mostly from ranches based at Cisco, Thompson, and Green River.

Recreation

While sightseeing, backpacking, winter sports, horsepacking, photography, and ORV use are potential recreation pursuits, hunting is by far the most prevalent recreation activity in the WSA. Black bear hunting is popular in the South Book Cliffs area. Twenty-one bears have been harvested in the South Book Cliffs in the last 10 years, and approximately 67 hunter days are spent annually pursuing black bear. Mountain lion hunting is also popular. An average of three lions are taken each year in the South Book Cliffs area, and seven hunter days are spent annually hunting mountain lions.

Deer hunting in the South Book Cliffs (including more than the Floy Canyon WSA) area is a unique experience. During the late 1950s and early 1960s as many as 3,600 bucks were harvested from the Book Cliffs area and, at that time, hunting was for either sex. Over the years deer numbers declined drastically to the point where hunting is now managed for four-point buck hunting only. Fewer hunters now pursue deer in the South Book Cliffs area. The area has changed from one of the best mule deer units in the nation to a trophy hunting unit. The area has little access and most hunting is done on foot or by horseback. It is a quality hunt with few deer seen, but many of those encountered are of trophy size. During the 1982 regular season 524 hunters spent 1,568 hunter days in the area. About 278 hunter days were spent by archers and 349 hunter days were spent by muzzleloader users. Overall, the area is utilized mostly

by deer hunters and, of those surveyed, most come to this area because of less hunting pressure and large, trophy-sized animals.

Elk hunting is by special permit and is limited to 40 permits for bull elk. In 1982, 27 elk were harvested in the South Book Cliffs for a 68-percent success ratio, which is very high for elk, when compared to 17 percent statewide.

Small game hunting for rabbits is good, but restricted mainly to drainage bottoms. Due to distances from major population centers, hunting pressure is light. Chukar hunting along the southern portion of the WSA is among the best in the state in terms of number of birds and hunter success.

In the Grand RMP, the entire WSA is designated as open to ORV use under 43 CFR 8340. Currently recreational ORV use is essentially nonexistent because of the WSA's distance from population centers and the presence of more attractive ORV use areas accessible from population centers. The rugged terrain presents a natural barrier to ORV use. Some of the approximately 24 miles of ways are used to a limited degree for hunting access into the area.

Although visitor use data have not been compiled, current recreation use of the WSA including hunting use is estimated at approximately 200 visitor days/year. The low use can be partly attributed to the lack of access and to the low, nonlocal public awareness of the area.

Wilderness Values

SIZE

At 72,605 acres, the WSA is of sufficient size to enhance wilderness values present. The WSA is of irregular configuration and is roughly 21 miles east to west and 11 miles north to south.

NATURALNESS

Imprints of human activity in the WSA are associated with mineral exploration, ranching activities, and recreation. The pattern of imprints is limited to areas of accessibility. Such areas are the lower terrain above the Book Cliffs face in the south and within the canyon bottoms crossing the unit. Although imprints do exist they are substantially unnoticeable in the area as a whole and the entire WSA is considered to meet the wilderness standards of naturalness. Human imprints in the WSA include the following: (1) a post-FLPMA rehabilitated vehicle way approximately 3 miles in length in the Dry Fork of Floy Canyon; (2) a pre-FLPMA vehicle way approximately 6 miles long in Floy Canyon; (3) five abandoned pre-FLPMA coal

FLOY CANYON WSA

mines covering about 5 acres each; (4) an abandoned pre-FLPMA uranium mine covering about 5 acres near Cub Spring in Horse Canyon; (5) an abandoned pre-FLPMA jeep trail system covering approximately 10 miles in the Tom Farrer Valley and Showerbath Spring area; (6) a pre-FLPMA corral and spring located in Floy Canyon; (7) a pre-FLPMA corral and evidence of early logging activities in Thompson Canyon; (8) a pre-FLPMA log cabin located in Right Hand Thompson Canyon; (9) a pre-FLPMA log cabin located in Sego Canyon; (10) a pre-FLPMA vehicle way covering approximately 5 miles in Thompson Canyon; (11) evidence of an old road leading to a coal mine on private property exists within Coal Canyon; (12) a recently rehabilitated pre-FLPMA oil and gas lease drill site; (13) approximately 9 miles of the northwestern boundary road in Right Hand Tusher Canyon; (14) a developed spring including a trough, barrel, and pipe works in Tom Farrer Valley; (15) a developed spring consisting of a 1.5-inch-diameter rubber hose and a cement trough in Showerbath Canyon; (16) a 2-mile long "cherry-stemmed" road in Floy Canyon located in the canyon bottom from the WSA's boundary to the intersection of Dry Fork and Floy Canyon; (17) a developed but primitive spring at the mouth of Horse Canyon; (18) two stockponds; and (19) approximately 15 drift fences.

SOLITUDE

The size, configuration, and topographic characteristics of the WSA enhance opportunities for solitude. Canyons ranging from 500 to 3,000 feet deep are separated by ridges and peaks in the north and benches or plateaus in the south.

The Floy Canyon WSA contains over 50 miles of canyon bottom. The bottoms vary considerably in width from about 10 feet to 0.50 mile. Lines of sight along the bottoms rarely exceed 0.50 mile and are usually considerably less. Canyons in the north half of the unit become more V-shaped from south to north. Canyons in the south and west are more distinctly terraced with vertical walls separating talus slopes. The vertical walls range from 100 to 1,000 feet. Topography by itself, in most of the unit, offers outstanding opportunities for solitude due to its screening ability.

In about 75 percent of the WSA (mostly in the north), vegetation augments solitude opportunities by providing screening. Significant cover by large trees and large shrub species is present within the canyons and atop the ridges, especially on northern exposures and in higher elevations. The canopy of trees in the pinyon-juniper/Douglas fir type creates closed or nearly closed areas. The

tree canopy in Douglas fir, Ponderosa pine, Gambel's oak, and aspen types also is closed. While tree canopy is more open in the juniper-pinyon type, it combines with large brush species to provide fairly continuous cover. The remaining 25 percent of the WSA (lower south and southwest) is dominated by sheer-faced cliffs, rock outcrop, and smaller shrub species.

Roads and traveled ways negatively affect opportunities for solitude when use on them occurs. The approximately 2 miles of road and 6 miles of traveled way up Floy Canyon are used mostly by ranchers and recreationists. The majority of use along the travel routes occurs in the fall. Vegetation along the travel routes is sagebrush and Gambel's oak. Average height of these species is 5 feet. The ability to find seclusion is possible because of the side slopes and thick tree cover. Sights and sounds of vehicular traffic within the unit is limited to immediate exposure or when viewed from higher elevation points.

A road between Coal Canyon and the Right Hand Tusher makes up the southwestern boundary of the WSA. Travel along this route is also associated with recreation and ranching. Opportunities for solitude in some points along this road, where the road runs within 0.50 mile of a talus slope and steep sheer-faced cliff to the north, is less than outstanding due to limited distance. In other portions, between the road and cliff or plateau top, the rugged topography of huge boulders and long fingered ridges allows for seclusion.

The ridge tops and high benches of the WSA offer extensive overlooks of the rugged terrain and impressive vertical relief within the area. Views can be seen of mountain ranges outside the WSA to the south, northwest, and west, 50 to 100 miles away. The San Rafael Reef, a prominent feature to the west, can be seen from many points in the WSA. Expansive views enhance the feeling of solitude within the WSA.

The deeply incised, branching drainages within the WSA allow dispersion of recreational use and provide for outstanding solitude.

In all, approximately 95 percent (68,975 acres) of the WSA meets the requirements for outstanding opportunities for solitude. Areas (5 percent, 3,630 acres) not meeting the standard lack the vegetative and topographic screening necessary to eliminate outside sights and sounds.

PRIMITIVE AND UNCONFINED RECREATION

The WSA's extensive canyon systems, ridges, abundant springs, wildlife trails, and old travel routes provide outstanding opportunities for a

FLOY CANYON WSA

variety of primitive and unconfined recreational activities. Hiking, backpacking, horsepacking, winter sports, hunting, wildlife observation, sightseeing, and photography are some of the opportunities available.

Foot trails largely comprised of old mining and game routes suitable for hiking and horsepacking exist within all of the unit's canyon drainages. Included are routes from the west side of Ute Canyon to Tom Farrer Valley into Cub Valley or Horse Canyon, and from the east side of Ute Canyon into Showerbath Canyon. Possible routes exist from Showerbath Canyon to Floy Canyon, and from Floy Canyon to Thompson Canyon, Renegade Canyon or the Right Hand of Thompson Canyon. Springs can be found in the mouth of Horse Canyon, the upper part of Middle Horse and Crescent Canyons, and in Floy, Dry Fork, Left and Right Hand Threeforks, Thompson, Right Hand Thompson, Renegade, Showerbath, Ute, Right Hand Tusher, and Se-go Canyons. These springs are a good source of drinking water for recreationists in the area.

The western and southern areas of the WSA are comprised of plateaus and ridges with steep-faced cliffs. Route finding is difficult and challenging. Water is limited outside of canyon drainages. Old mining routes in several canyons in the south part of the WSA add access to the higher plateaus.

Hunting opportunities for both large and small game are unique in the Book Cliffs. Black bear, mountain lion, deer, elk, rabbit, and chukar hunting opportunities are excellent. The area has limited vehicular access and most hunting is done on foot or horseback.

From the south to the north, interesting colors and rock formations are present, adding interesting scenic quality to the unit. Along the southern portion, the sheer-walled character of the plateau's face is interrupted by a collapsed area where a field of hoo-doo's appear. Tall pedestals of less resistant soils hold the huge rock slabs of a more resistant nature. A finely carved barrel-shaped chute also exists within the drainage's route. Several other places in the unit's southern half expose such character. The northern terrain is a colorful mix of interesting pinnacles and rock figures. Outstanding sightseeing and photography values are emphasized by these features. Waterfalls and a mix of vegetation add interest to the winding canyon bottoms, especially in the north portion of the unit.

The many drainages and the dissected terrain provide hundreds of potential hiking routes up

canyon bottoms and along ridge tops. Opportunities for hiking, backpacking, and hunting are considered outstanding throughout the WSA.

In conclusion, the entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

SPECIAL FEATURES

The WSA contains supplemental scenic, geologic, and cultural values. The northern part of the WSA, notably Se-go Canyon, Thompson Canyon (and its associated canyons), Floy Canyon (and its associated canyons), Showerbath Canyon, Ute Canyon, and the head of Horse Canyon (and its associated canyons) contain scenic areas. Rock outcroppings, pinnacles and chimneys, soil colors, dense and varied mixtures of vegetation, and waterfalls and stream systems enhance the visual character of the area.

Even in the southern portions of the unit there are unusual formations such as rock pedestals and dramatic and textured cliff faces. An unusual strata exposed in the northern portions of the WSA along the Book Cliffs is the conglomerate Wasatch Formation. The dark-brown cobblestone layer, ranging from 5 to 20 feet thick, is related to discontinuous and ancient stream channeling.

The WSA provides habitat for big game animals that shy away from areas of human occupation. The WSA is largely unknown to the public; it is probable that many scenic and archaeological features not mapped or named could be found by primitive recreation users.

Cultural values, such as historic log cabins and related trails, exist within the unit. Outside and adjacent to the southern boundary several homesteads and ancient Indian writings exist. The occurrence of these values adds potential in terms of cultural significance associated with the WSA.

Land Use Plans and Controls

Ownership both within and adjacent to the WSA is predominantly Federal land administered by BLM. There are approximately eight sections (5,148.61 acres) of State land within the WSA. Thirteen more State sections are located outside of but adjacent to the WSA. Additionally the WSA is contiguous for about 5 miles with the Uintah and Ouray Indian Reservation at the north end. One 160-acre private in-holding is present in Coal Canyon. Six other private tracts are found outside

FLOY CANYON WSA

and adjacent to the WSA. The adjacent and in-held State lands are very similar in character to lands within the WSA.

The State sections in the Book Cliffs are generally leased for oil, gas, hydrocarbons, and coal. Leases run for 10 years. Given the perceived mineral potential for the area, it is likely that these sections would be leased again upon lease expiration. All State sections within and adjacent to the WSA are leased for grazing. There are no existing or proposed rights-of-way within the WSA.

Access to the WSA is currently from I-70 by means of a graded dirt county road (Floy Canyon road). This road is "cherry-stemmed" for about 2 miles into the WSA. The WSA can be reached within 30 minutes to 1 hour from I-70. Roads below the Book Cliffs are well maintained for oil field operations; above the cliffline they are sometimes impassable after wet weather or heavy snow.

The WSA is contiguous with four other BLM WSAs: Desolation Canyon, Coal Canyon, Spruce Canyon, and Flume Canyon.

The WSA is managed in accordance with the Grand RMP. The RMP acknowledges the wilderness review but does not address wilderness designation or nondesignation. Actions planned in the Grand RMP are included in the description of the No Action Alternative.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) recognizes mineral potential in the Book Cliffs area but does not make site-specific land use recommendations pertaining to the Floy Canyon WSA, and it is not specifically mentioned in the plan. The plan generally emphasizes continuation of present uses and maximizing mineral development.

Socioeconomics

DEMOGRAPHICS

The WSA is in north-central Grand County. The socioeconomic effects of wilderness designation or nondesignation would be spread among communities in Grand County and eastern Emery County, Utah, with some spillover into western Mesa County, Colorado.

Grand County can be characterized as rural and sparsely populated. The 1982 county population was 8,100, less than 1 percent of the State population of about 1.5 million (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab and 32 percent lives in Spanish Valley, which is adjacent to and southeast of Moab (USDC, Bureau of the Census, 1981). The land in Grand County comprises about 4.5 percent of the state, or about 3,615 square miles. About 80 percent of the county is owned by the Federal government, 15.5 percent by the State, and 4.5 percent by private landowners.

Mesa County had a 1981 population of 87,100. Grand Valley, which is in the midwestern part of Mesa County, contains 83 percent of the county's population. Grand Junction (1980 population of 28,194) serves as a major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981).

The communities nearest to the WSA are Thompson (population 200) about 30 miles southwest, and Cisco (population 45) about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado, is about 40 miles east of the Harley Dome exit on I-70, and Green River and Moab, Utah are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

EMPLOYMENT

Recent statistics show that 99 percent of local wage and salary employment in Grand County is nonfarm, with about 17 percent employed in Federal, State, and local governments (USDC, Bureau of Economic Analysis, 1983). Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent minings and milling layoffs currently reduce mining's local importance. Tourism directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export industries contributes to local income and employment. Including these multiplier effects, mining and tourism directly and indirectly account for 35 to 45 percent and 17 to 25 percent of local employment, respectively. Unemployment in the county is among the highest rates in the state with a rate of almost 18 percent (Utah Department of Employment Security, 1983). This is primarily due to large mine layoffs and the resulting downturn through the local economy. Refer to Table 9 for data concerning personal income and employment for Grand County.

FLOY CANYON WSA

TABLE 9
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agricultural	1	1
Mining	34	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10 ¹	8
Retail Trade	10 ¹	18
Finance, Insurance and Real Estate	3	2
Services	11 ¹	16
Other	—	—
Total Private Industry	85	82
Federal Government	5	6
State and Local Government	9	10
Total Government	14	17
Total Nonagricultural	99	99
Unemployment (1st Quarter, 1983)		18
	(Dollars) ²	(Jobs)
Total Employment and Earnings	52,753	3,617
Total Personal Income	75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

¹Includes 12 percent of total income due to tourism.

²In thousands of dollars.

Note: Because of rounding, numbers are not additive. Employment percentage figures include only wage and salary employment. The relative importance of farm equipment is, therefore, underrated. Tourism is included as part of Services, Retail Trade and Other.

Green River (population 1,048) in Emery County on the Grand County line is basically a farming and tourism community because of its location at the crossroads of U.S. Highway 6 and I-70. The mining and government sectors are also major employers in the area.

In Colorado, Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the recent decrease in oil shale activities, the local economy still shows some signs of growth.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, livestock production, and recreation. Table 10 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

TABLE 10
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	\$400	None
Oil and Gas Leases	None ²	Up to \$97,302
Livestock Grazing	\$56,500	Up to \$ 3,955
Recreational Use	\$820	
Total	\$57,720	Up to \$101,257

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

²Although previous exploration in the WSA has generated local expenditures, none are occurring in connection with the WSA at present. Activities on WSA leases held by production or unit agreements are occurring outside of the WSA and contribute to the local economy.

The WSA has four mining claims that appear current in assessment work. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

Oil and gas exploration conducted in the WSA has generated some temporary local employment and income (estimated at less than 8 work years in the past 10 years).

Nine livestock operators have a total grazing privilege of 2,825 AUMs within the WSA. If all this forage were utilized, it would account for \$56,500 of livestock sales, including \$14,125 of ranchers' returns to labor and investment.

Woodland product harvest, if any, has been small and is insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use and related local expenditures are low and are associated with hunting. The WSA's motorized recreational use is also associated with hunting and is low. Local expenditures for recreational use in the WSA are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Floy Canyon WSA is estimated at about 200 visitor days per year; therefore, expenditures attributed to use of the WSA are estimated at \$820 annually.

Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Grand County.

The WSA generates revenues to the Federal Treasury from two sources: mineral leases and grazing fees. Within the WSA, about 32,434 acres are leased for oil and gas. At \$3 per acre, this would generate up to \$97,302 annually. Half of these monies would be allocated to the State of Utah, which then reallocates these revenues to various funds, the majority of which are related to local energy development. Based on the 2,825 AUMs of forage that could be consumed by livestock in the WSA and a grazing fee of \$1.40, the WSA annually accounts for as much as \$3,955 of grazing fee revenues to the Treasury. Half of these monies are allocated back to the local BLM District for the construction of rangeland improvements.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the

WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to oil and gas and other leasable and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but would probably be low to moderate due to the unit's rough terrain and uncertain resource potential. The following analysis is based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium/vanadium, 20 acres; and coal, 1,270 acres. Because oil shale is not likely to be found within the WSA, no surface disturbance is anticipated for this resource. In the foreseeable future, surface disturbance for development of the coal resource is unlikely because there are other more productive areas for coal development in the area; however, coal in the WSA could be extracted in the long term. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.) In addition, a burning-and-seeding project designed to improve livestock forage would cause temporary surface disturbance on 905 acres. Total surface disturbance could be as much as 2,355 acres.

AIR QUALITY

The WSA would continue to be managed as a PSD Class II area. Total disturbance of up to 2,355 acres would result in increases in fugitive dust emissions during disturbance. The proposed burning project would have temporary air quality impacts. Air quality impacts from underground mining activities would be minor and conditions would remain essentially as at present because no major source of air pollutant emissions is proposed in or near Floy Canyon WSA.

GEOLOGY

Little impact to the area's geologic structure is expected. Surface disturbances associated with

FLOY CANYON WSA

development of oil and gas generally do not involve the subsurface except for development of widely spaced wells. Underground mining associated with uranium and coal development could result in subsidence on up to 1,290 acres. However, the coal resource probably would not be developed in the foreseeable future due to more productive coal areas nearby but outside of the WSA.

SOILS

It is estimated that up to 1,450 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated to be about 0.62 cubic yard/acre/year. If disturbed, the soil loss would average 8.70 cubic yards/acre/year. Soil loss on the 1,450 disturbed acres could increase from 899 cubic yards/year to 12,615 cubic yards/year. Therefore, with this alternative, maximum annual soil loss in the WSA could increase by approximately 11,716 cubic yards (approximately 2 percent) over the current annual soil loss of 631,656 cubic yards to approximately 643,372 cubic yards/year. Soil loss would decrease as reclamation occurred.

Soils also would be disturbed from rangeland developments. The 905 acres of vegetative treatment would be designed to improve ground cover and soil conditions. Ground cover would be disturbed during the early implementation stages, increasing erosion during the short term. BLM experience in the affected area indicates that the plant density existing before disturbance would be achieved in about 4 years and would continue to increase thereafter (USDI, BLM, 1982b).

VEGETATION

No major changes in vegetation types would be expected to result from the 1,450 acres of potential mineral-related disturbances (less than 2 percent of the WSA). Disturbance in the form of roads and drill pads could, however, alter the composition of the riparian community (less than 5 percent of the WSA) if development occurred there (which is unlikely due to mitigation). The vegetation on 905 acres would be changed primarily to grasses and forbs, then eventually would adjust toward shrub and young tree growth. No impacts would occur to threatened, endangered, or sensitive plant species since none are found within the WSA.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance occurs, increased sediment yield can affect water quality. Surface

disturbance from mineral and energy development could impact up to 1,450 acres with this alternative, with a soil loss increase of approximately 11,716 cubic yards/year. Sediment yield in streams could increase in proportion to the erosion increase. However, the development of watershed treatments identified for Floy, Dry, and Thompson Canyons could be carried out with this alternative to minimize downstream damages from flooding and erosion. This would reduce sediment yield and offset any increase in sediment due to surface disturbance. There would be little change in ground water quality resulting from mineral-related surface disturbance.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

With this alternative, all 72,605 acres in the WSA would remain as oil and gas Category 2 (standard and special stipulations). The wilderness protection stipulation on post-FLPMA leases would be removed. There would be 40,171 acres that are currently not leased available for leasing.

The WSA is considered to have relatively small, widely scattered oil and gas pools, anticipated to contain less than 10 million barrels of oil and less than 60 billion cubic feet of natural gas. Of this, less than 18 billion feet of gas or 3 million barrels of oil is estimated to be recoverable. These oil and gas resources could be explored and recovered without concern for wilderness values. Due to the predicted small, scattered deposits it is unlikely that major oil and gas production would occur; however, activities on leases held by production adjacent to the WSA could extend into the WSA.

Oil Shale

There are no oil shale leases in the WSA. According to SAI, the potential exists for thin beds of oil shale that would yield less than 15 gallons of shale oil per ton of shale. However, field observation indicates that there probably is no oil shale in the Floy Canyon WSA due to the absence of geologic formations that contain such deposits. Therefore, although the area would be available for oil shale development with this alternative, none likely would occur and the oil shale withdrawal on 5,760 acres in the WSA would not be used.

Coal

With this alternative, part of the WSA could be made available for lease, and coal exploration and development could occur. A 25,540-acre area of known recoverable coal has been identified in the

FLOY CANYON WSA

WSA. There is a high probability that moderate amounts of varying quality coal (143 million tons) underlie the WSA. As much as 71 million tons could be recovered, although development in the near future is not likely due to better quality, more accessible coal elsewhere in the vicinity.

Locatable Minerals

Locatable mineral development could occur within the WSA with this alternative. The WSA would remain open to mining claim location and new claims could be filed, with the exception of 5,760 acres currently under oil shale withdrawal, which would remain closed to mineral locations. The potential deposit of less than 500 tons of uranium oxide could be developed with this alternative. It is unlikely that production would ever occur due to the depth of the deposit and the more accessible locations of the resource elsewhere.

The WSA is not predicted to contain minable gold deposits. Production is, therefore, unlikely for this resource, even though four placer mining claims are present in the WSA and could be worked without concern for wilderness values.

WILDLIFE

The WSA provides crucial habitat for several species sensitive to human encroachment (2,000 acres crucial year-round habitat and 56,575 acres crucial winter habitat for bear, cougar, deer, and elk.) These species would be adversely affected in the short term by surface disturbance of up to 1,450 acres for mineral exploration and production. Generally, the effect on wildlife by such disturbance (approximately 3 percent of the WSA affected) would be negligible. This disturbance could, however, reduce crucial elk, bear, deer, and mountain lion habitat by 1,450 acres during the period of disturbance. Reclamation could result in habitat being improved in the long term. Mobile animals, including elk, bear, deer, and mountain lion, would leave the area of disturbance. Populations would be reduced during the time of disturbance, and these animals might or might not return after activities ceased. This is especially true if year-round access were developed and human occupation to the area were to increase. Oil and gas leasing categories would provide special stipulations to protect certain wildlife species (elk winter range). It is assumed that similar stipulations would be imposed for coal leasing if lands were made available for this type of lease.

There are no Federally designated critical habitats that could be affected. The entire Book Cliffs

range in east-central Utah provides similar habitat, but habitat is limited over southeastern Utah to areas of higher elevation. Most of the east Book Cliffs area is now subject to some development pressure and could eventually result in loss of bear, cougar, deer, and elk habitat.

Potential bighorn sheep transplants could occur with this alternative without consideration given to wilderness resources. Developments to improve wildlife habitat could be allowed in the future, although none are currently planned.

The potential vegetation treatment of 905 acres of burning could occur with this alternative. The burn, however, is proposed for livestock forage improvement and would have little benefit to wildlife species.

Although endangered and candidate species, if present, could be inadvertently impacted, they generally would be protected as a result of provisions in the Endangered Species Act.

FOREST RESOURCES

Harvest of the woodland products in this WSA (including up to 8,802 cords of firewood) would be allowed with this alternative, but use probably would not exceed low levels due to limitations on resource potential, topographic restraints on access, and the availability of the resource elsewhere. As much as 1,450 acres of potential disturbance (approximately 2 percent of the WSA) could result from mineral exploration and development and 905 acres of pinyon-juniper loss would occur with the planning vegetation manipulation. Because disturbance would be small and only a small percentage of trees would be disturbed, no significant loss of forest products would result. There would be no change in existing forest management or resource production with this alternative.

LIVESTOCK

Few, if any, changes in livestock use or management techniques are expected with this alternative. Domestic livestock grazing would continue as authorized in the Grand RMP. The 2,825 AUMs currently allocated within nine allotments are used by livestock of nine permittees.

The possible 1,450-acre disturbance from mineral exploration and development could reduce livestock forage up to 2 percent until rehabilitation is complete. This would not affect current livestock operations because the forage in the WSA is currently underutilized.

There is little current use of motorized vehicles for managing livestock, but what use is occurring

could continue or accelerate. Existing rangeland improvements including 15 short-gap fences, one corral, four developed springs, and two stock ponds could be maintained without concern for wilderness values. New rangeland developments, such as the 905-acre burning-and-seeding project, could be carried out without concern for wilderness values. The planned burning would result in an increase in 113 AUMs of livestock forage available in the WSA.

VISUAL RESOURCES

With this alternative, visual quality in the WSA partially would be protected by limitations placed on potential surface-disturbing activities (i.e., 67,525 acres would be managed under VRM Class II objectives requiring that activities not be apparent and 5,080 acres would be managed for Class IV which allows changes to be evident if visually integrated).

Even though mitigative measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 1,450 acres of surface disturbance from oil or gas or uranium activities would be degraded, and VRM Class II management objectives would probably not be met in disturbed areas during the short term. After rehabilitation, visual resources would be restored to meet VRM objectives. Even after mitigation and rehabilitation, some permanent localized degradation could result from energy-related exploration and development. Rangeland developments, including the 905 acres of proposed land treatments, would also reduce visual quality in the affected area, although the development would be designed to meet VRM objectives as much as possible.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for up to 1,450 acres of mineral-related surface disturbance under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would lessen impacts. However, some of the 60 potential cultural sites (as many as half of which could have National Register potential) could be in the disturbed areas and might be inadvertently damaged or destroyed. Vandalism of sites would be expected to increase in proportion to the general population increase as well as to any increase in roads from mineral and energy exploration and development. Since there are little field data on cultural sites, the overall effect on cultural resources is unknown.

RECREATION

Primitive recreational opportunities and quality would be diminished on the 1,450 acres that could be disturbed by mineral and energy activities and the 905 acres that would be disturbed by land treatments. The entire WSA, including approximately 24 miles of existing vehicular ways, would continue to be open to vehicular access. Existing vehicular ways, as well as new access roads and ways from energy exploration, would provide vehicular access for nonprimitive recreational uses. Motorized activities would be allowed in the entire WSA although use is largely limited by the area's steep terrain.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreational use is expected to increase from the estimated 200 current visitor days per year to about 298 visitor days at the end of 20 years.

Since energy and mineral exploration and development could result in improved access into the area for nonprimitive recreation (including hunting), recreational use could increase to a greater degree. However, the quality of the hunting experience could be reduced if animal numbers were reduced by loss of habitat from disturbance and increased use pressures.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be in accordance with the Grand RMP. Mineral and energy exploration and development could disturb up to 1,450 acres. Some of the naturalness values now existing (the entire WSA meets the wilderness standard) would be lost by this disturbance. Such imprints as benched roads and drill pads on steep, rocky slopes would be irreversible.

Outstanding opportunities for solitude (now on 68,975 acres) could be adversely impacted by the sights and sounds of operations within parts of the WSA while operations were ongoing. Primitive recreation values, outstanding throughout the entire WSA, could also be adversely impacted in portions of the WSA by potential surface disturbance. Hunting is the most popular activity and would be highly influenced by impacts to wildlife and their habitat. If roads and drill pads are located throughout the WSA, the related surface disturbance would result in a significant loss of

naturalness, solitude, and outstanding opportunities for primitive and unconfined recreation throughout the area as a whole.

Special features (i.e., ecosystem variation, scenic qualities, cultural resources, and sensitive wildlife habitat) could also be reduced due to mineral-related surface disturbance.

LAND USE PLANS AND CONTROLS

Nondesignation would be consistent with the Grand County goal of continued multiple use and maximized mineral production. This alternative is based on the Grand RMP and would be in conformance with it. The RMP has been reviewed by the Governor and found to be consistent with plans of the State of Utah. The No Action Alternative would also be consistent with the State of Utah policy of emphasizing economic return from State school lands.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil, gas, coal, and uranium/vanadium in the WSA were developed it would lead to increased employment and income for Grand County. However, the probability of economic development of minerals within the WSA is moderate to low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no livestock-related economic losses because the existing grazing use (2,825 AUMs available) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed vegetation treatment that would produce 113 AUMs of new allocated forage could lead to an additional \$2,260 of livestock sales, including \$565 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase to only 298 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related annual expenditures of \$1,222 attributable to the WSA likely would not be significant to the local economy.

Existing Federal and State revenues would not be reduced by this alternative. In addition, there are

40,171 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to \$120,513 additional Federal lease fee revenues per year in addition to possible new royalties from lease production. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (currently up to \$3,955 per year) would continue. The additional 113 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative could increase Federal revenues by \$168 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (72,605 Acres)

As cited in the Description of Alternatives section, the major changes that could occur in the 72,605-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The entire 72,605 acres would also be closed to ORV use, except for approvals by BLM. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that uranium claims would be filed prior to wilderness designation and would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that, except for unitized leases or leases held by production outside the WSA, existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases that lapse would not be renewed and future leasing of oil and gas, as well as any other mineral resource, would not be allowed. Unitized or developing leases on approximately 13,173 acres could be developed inside the wilderness. Disturbance from development could be as much as 29 acres. Therefore, total disturbance under this alternative could be as much as 49 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) The 905-acre proposed burning-and-seeding project would not be allowed.

Because potentially disturbed areas would be smaller than under the No Action Alternative (49 vs. 2,355 acres), the impacts from development and surface disturbance on air quality, geology, water, vegetation, livestock, and forest resources for the All Wilderness Alternative would be less than the generally insignificant impacts as described for the No Action Alternative. Wilderness

designation would provide additional protection to these resources due to reduction in potential surface disturbance. Other effects on these resources due to changes in management are discussed below.

SOILS

Overall, the soil resource would benefit from the All Wilderness Alternative because mineral-related surface-disturbing activities are not expected to exceed 49 acres. The average rate of soil loss at present is estimated at about 0.62 cubic yard/acre/year. If disturbed, the soil loss would average 8.70 cubic yards/acre/year. Soil loss on the 49 disturbed acres would increase from approximately 30 cubic yards/year to 426 cubic yards/year. This is 11,320 cubic yards/year less soil loss than under the No Action Alternative. The 905 acres of land treatment would not occur with this alternative; therefore, increased erosion during the short term and less erosion over the long term from such treatment would not occur under this alternative.

GEOLOGY

With this alternative the coal resource would not be developed and there would be little potential for subsidence.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 49 acres under this alternative. Because of the minimal area affected, there would be no significant change in water quality from the current situation. The planned watershed developments in Floy, Dry, and Thompson Canyons would likely not be allowed unless they are designed to blend with the wilderness environment, constructed of natural materials, and placed by hand methods. Damage from flooding and contribution to downstream salinity would continue to occur if the watershed developments are not installed.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Wilderness designation would result in closure of the area to future oil and gas leasing. Existing pre and post-FLPMA leases (7,873 acres and 24,561 acres, respectively) including 5,300 unitized acres, could be developed subject to the stipulations issued at the time of leasing. Leases on at least 13,173 acres including the unitized acreage

would continue to be held by production outside the WSA, and could eventually be developed inside the WSA. It is unlikely that the other existing leases would be developed or a showing of commercial quantities made prior to their expiration dates, and expired leased will not be reissued. Assuming that the oil and gas resource is found equally throughout the WSA, exploration for and development of a potentially recoverable resource of less than 2.5 million barrels of oil or less than 14.8 billion cubic feet of natural gas could be foregone under this alternative. However, due to the small size of the potential deposits and the terrain restrictions, it is unlikely that large quantities of production would occur from the area even without wilderness designation. Therefore, this alternative would not result in significant loss of potential oil and gas recovery.

Oil Shale

The opportunity for leasing and recovery of oil shale from the WSA would be foregone under this alternative. However, field observation indicates there is no potential for oil shale within the WSA; therefore, development likely would not occur even without wilderness designation.

Coal

There is a high probability that moderate amounts of coal (143 million tons) underlie the WSA. A 25,540-acre area of known recoverable coal has been identified in the WSA. No leases for this resource exist and none would be issued in the future with this alternative. Thus, the potential for recovery of the WSA's coal (approximately 71 million tons is considered recoverable) would be foregone.

Locatable Minerals

The area would be withdrawn from mining claim location. There is potential for less than 500 tons of uranium oxide and vanadium (which is considered a strategic mineral). It is unlikely that any recoverable gold or silver is in the area.

About 640 acres of the WSA are covered with placer claims. Placer and uranium claims can be filed up until wilderness designation. Development work, extraction, and patenting would be allowed to continue under unnecessary or undue degradation guidelines on valid mining claims after wilderness designation. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of the locatable mineral resources. The greatest impact to locatable minerals would occur if the recoverable resources are not within mining claims filed prior

FLOY CANYON WSA

to designation. In that case, the potential for recovery of less than 500 tons of uranium and vanadium would be foregone.

WILDLIFE

Wildlife would benefit from preservation of solitude and reduction of potential mineral-related surface disturbance from 1,450 acres with the No Action Alternative to 49 acres under wilderness designation. Crucial habitat for elk, black bear, deer, and mountain lion would receive the most protection from surface disturbance under this alternative. Potential bighorn sheep transplants would be allowed. Future wildlife developments might be limited; none are currently planned.

The 905-acre land treatment planned for livestock would be foregone under this alternative; however, this would have little value to wildlife habitat.

The one endangered and four candidate species, if present in the WSA, would have the added protection of wilderness management, with limitations on disturbance.

FOREST RESOURCES

With this alternative, no woodland harvest would occur. The potential harvest of up to 8,802 cords of firewood would be foregone. This would not be a significant impact to recovery of woodland products due to limited existing and potential use in the WSA and the availability of woodland products elsewhere in the vicinity.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Grand RMP. The approximately 2,825 AUMs currently allocated in the WSA would remain available for cattle forage. The area would be closed to vehicular travel except for approximately 2 miles of the "cherry-stemmed" travel route within Floy Canyon, which would remain available for vehicular access. Because very little use of motorized vehicles is currently taking place to manage livestock (except for travel within Floy Canyon), little effect on livestock grazing management is expected from closure of the area to ORV use.

Existing rangeland improvements (15 short-gap fences, one corral, four spring developments, and two stock ponds) would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. The only project currently planned, a 905-acre burning-and-seeding vegetation treatment,

probably would not be allowed, and the 113 AUMs of forage that would result from the treatment would be foregone.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the visual resources in the WSA. With this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through management under VRM Class I (which generally allows for only natural ecological change) through closure of the area to ORV use, and through closure of much of the area to future mineral leasing and location.

With this alternative, disturbance from 905 acres of planned vegetation manipulation would not occur and the possible mineral-related disturbance would be reduced from 1,450 acres to 49 acres, associated with development of valid mining claims and production-held oil and gas leases. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. If roads for development of valid mining claims could not be denied, VRM Class I objectives might not be met on a large portion of the WSA. Because the potential for mineral development is moderate to low and wilderness designation would limit the potential for surface disturbance, visual quality would probably not be impacted in the WSA as a whole.

CULTURAL RESOURCES

Wilderness designation would benefit cultural resources by limiting the amount of surface-disturbing activity (especially additional roads) and by restricting motorized access. There would be potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities, resulting in an overall positive impact.

RECREATION

This alternative would benefit primitive recreation opportunities by reducing the likelihood of surface-disturbing activities from mineral exploration and development and increasing public recognition to wilderness recreational values. Hunting opportunities would benefit because crucial habitats for animals sensitive to human intrusion (elk, bear, and mountain lion) would

FLOY CANYON WSA

receive added protection from surface-disturbing activities. Although hunting access with use of vehicles would be lost and future hunting would be limited to foot or horseback methods, the quality of the hunting experience could be improved.

The entire 72,605 acres (including about 24 miles of vehicular ways) would be closed to ORV recreational use. This would not be a significant loss of ORV opportunity because this activity is almost nonexistent within the WSA.

Mineral-related surface disturbance on up to 49 acres could cause localized reduction in primitive recreational values in the WSA. With only 49 acres of surface disturbance, primitive recreation values would likely be preserved in the area as a whole; however, any new vehicular access associated with prior existing rights could impact primitive recreation values in parts of the WSA.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity for the WSA that likely would follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Judging from use densities of a number of well known wilderness areas and primitive areas in the region, the WSA's site characteristics, the population distribution about the WSA, and the availability of similar sites, it is estimated that use after designation could be as much as 7,261 visitor days per year. This is 7,061 visitor days more than the area's current annual visitor use. Management provided through a Wilderness Management Plan would provide for avoiding destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. Commercial outfitting for hunters would benefit. As recreation use increased other commercial operations based on primitive recreational activities could use the WSA.

WILDERNESS VALUES

Wilderness designation and management would contribute to the preservation of the area's wilderness values. The WSA contains 72,605 acres with naturalness and outstanding primitive and unconfined recreation values, and approximately 68,975 acres with outstanding solitude values. The special features in the WSA (i.e., ecologic, scenic, and cultural values) would also be protected.

The potential exists for up to 49 acres of surface disturbance from mineral and energy exploration

and development. No disturbance from potential rangeland developments is anticipated. Wilderness values within or near the disturbed acreage could be lost or reduced. If roads are located throughout the WSA, wilderness values could be lost in the area as a whole, although this is not likely to occur due to the moderate to low amount of mineral and energy resources and the area's rough terrain.

The WSA is immediately adjacent to two other BLM WSAs and the primitive area portion of the Uintah and Ouray Indian Reservation. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness with the All Wilderness Alternative for the Floy Canyon WSA, if the adjacent WSAs also were designated as wilderness.

Recreational use of the WSA could be as much as 7,261 annual visitor days but would probably not decrease wilderness values of solitude and primitive recreation because of the large size of the WSA. Also, the management plan for the area would focus on dispersed use opportunities.

Although potential surface-disturbing activities on up to 49 acres could impair values to some degree through mineral and energy development, wilderness designation and management would protect the wilderness values present.

LAND USE PLANS AND CONTROLS

Wilderness designation generally would be consistent with some aspects of the *Grand County Master Plan* because several resource uses would be allowed, although under more restrictive conditions. Designation would not be consistent with Grand County's stated policy of maximizing mineral development. If State lands (about eight sections) within the WSA are exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Access to the 160-acre private in-holding would be allowed, which could result in some wilderness manageability problems.

The BLM Grand RMP does not provide for wilderness designation. Designation of the Floy Canyon WSA as wilderness would be an amendment to the RMP.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources with wilderness designation, there

could be losses in Federal revenues currently provided by resource uses in the WSA (refer to Table 10) as well as loss of potential increases in local income and Federal revenues that otherwise could occur.

Increased public awareness of the area resulting from wilderness designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures could increase to as much as \$29,770 (average of \$4.10 per visitor day). Motorized recreational use of the WSA is light. The decrease in related local vehicle-related expenditures would be small and insignificant to both the local economy and individual businesses.

Expenditures associated with recreation in the WSA would be well distributed among businesses in Green River and Moab, Utah, with some spill-over into western Mesa County, Colorado. However, the resulting local expenditures would be regionally insignificant. Other than to outfitters, recreation expenditures would also be locally insignificant to any single business in the affected area.

The potential for mineral and energy development in the WSA is moderate to low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from those that could otherwise occur with mineral development in the long-term future. In 1980, approximately 0.001 people per acre were employed in the exploration and production of oil and gas from the most productive region in Grand County. The implication is that up to 75 jobs would be foregone with designation of the Floy Canyon WSA. However, since no active exploration is occurring in the WSA and there are numerous existing leases in the vicinity that still could be developed, the potential for impacts to local employment probably would be insignificant.

Although some of the potential labor requirements would come from workers temporarily moving into the area, the majority of workers would be hired from Green River and Moab, Utah, and eastern Mesa County, Colorado. Many oil and gas field services would be provided by local businesses, and some of the wages earned by the oil and gas workers would circulate through the

local economy. Exploration and development of an area's oil and gas resources are the most labor intensive phases of oil and gas production, but are of relatively short duration.

Any local income related to assessment of future mining claims would be lost. Because the potential for mineral and energy development in the foreseeable future is not high, it is estimated that the potential for related local income would not be significantly reduced by wilderness designation.

Livestock use and ranchers' income would continue as at present with \$56,500 of livestock sales, including \$14,125 of ranchers' return to labor and investment. The 905-acre proposed vegetation treatment for livestock would be foregone along with any resulting increase in ranchers' income. If this project were implemented and the additional forage used, ranchers' returns to labor and investment could have increased by \$565 and livestock sales could have increased by \$2,260.

Designation would have little impact on the development of other energy and mineral resources. With the WSA's potential for oil shale highly unlikely, wilderness designation should have little affect on development of this resource. As for coal, the local employment opportunity and economic benefits resulting from development of the varying grade of coal found in the WSA is unknown; however, short-term employment and income opportunities associated with coal in the WSA do not exist. Although long-term development of the coal resource would be foregone, the resulting potential local employment and income foregone would probably be small in relation to other coal areas in Utah.

As the proposed vegetation burning-and seeding-project would not be developed and used, an estimated annual \$158 of Federal grazing revenues from 113 increased AUMs would be foregone.

Wilderness designation would eliminate the potential for future woodland product harvesting and related Federal revenues. There is no present harvest from the WSA.

Partial Wilderness Alternative (23,140 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action

Alternative. The specific actions that would take place within the 23,140-acre area designated as wilderness and the 49,465-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, mining claims (if established) would eventually be explored and developed, causing an estimated 6 acres of disturbance. It also is assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be renewed and future leasing of oil and gas, oil shale, or coal would not be allowed.

It is assumed that, within the nondesignated area, up to a total of 1,192 acres would be disturbed sometime in the future. This would be due to the possible development of uranium/vanadium on 14 acres, oil and gas development on 109 acres, coal development on 864 acres, and vegetation treatments on 205 acres. No disturbance is estimated for oil shale development due to the absence of this resource in the WSA. Overall, 1,198 acres of surface disturbance could occur within the WSA. This amount would be 1,157 acres less than under the No Action Alternative and 1,149 acres more than the All Wilderness Alternative. (Appendix 10 lists the mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 2,355 acres of surface disturbance, would not significantly affect air quality, geology, water, vegetation, livestock, and forest resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes up to 1,198 acres of surface disturbance.

Restrictions on management and development methods within the WSA would result in the same types of impacts on development of water sources, mineral and energy resources, livestock grazing, and land use plans but to a lesser degree than described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

SOILS

Overall, the soil resource would be expected to benefit with the Partial Wilderness Alternative because mineral-related surface disturbance would be limited to 993 acres. Of that, 6 acres would be within the designated portion and 987 acres would be in the nondesignated area. The average rate of soil loss on the disturbed area

would increase from .062 cubic yard/acre/year to 8.70 cubic yards/acre/year. Soil loss on the 993 acres would increase from approximately 615 cubic yards/year to 8,639 cubic yards/year. This loss would be approximately 3,077 cubic yards/year less than under the No Action Alternative, but 8,213 cubic yards/year more than under the All Wilderness Alternative. Soil loss would decrease in disturbed areas as reclamation occurred.

The likelihood of the soil loss occurring to the extent indicated is low because mineral development probably would not occur in the foreseeable future and any coal leases would require mitigative measures to avoid long-term impacts. Approximately 205 acres of the proposed 905-acre land treatment would be allowed with this alternative in the nondesignated portion of the WSA. Some benefit of reduced erosion over the long term could be derived from such treatment.

GEOLOGY

With this alternative most of the coal resource in the WSA could be developed, and subsidence could result as discussed for the No Action Alternative.

VEGETATION

With this alternative, vegetation would be protected on the 23,140 acres that would be designated wilderness, except on as much as 6 acres that could be disturbed from mineral exploration and development. In the area that would not be designated, as much as 933 acres could be disturbed from mineral and energy exploration and development and an additional 205 acres could be disturbed from proposed land treatment. Overall, if full development were to occur (which is unlikely) less than 2 percent of the WSA would be temporarily disturbed or denuded. No major change in vegetation types would occur. No threatened, endangered, or sensitive plant species exist in the WSA.

WATER RESOURCES

Surface water would benefit because of the reduced likelihood for surface disturbance, as described in the All Wilderness Alternative. Increased soil loss of up to 8,024 cubic yards/year with this Partial Wilderness Alternative could increase sedimentation in drainages but not to the degree that could occur under the No Action Alternative. Runoff control and water quality protective measures would be required as part of any coal development. Watershed treatments could be constructed as planned in Floy, Dry, and Thompson Canyons which would reduce flood

damage presently occurring downstream and offset any increases in sediment due to mineral-related disturbances. As with the other alternatives, significant impacts to the quality of ground water due to mineral-related disturbances is unlikely.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Within the designated portion of the WSA, existing leases (about 4,800 acres of pre-FLPMA leases and 9,430 acres of post-FLPMA leases), could be affected. Except where leases are held by production or unit agreement, it is predicted that they likely would expire without development. The designated wilderness area would be closed to future leasing (Category 4) and no new leases would be issued. It cannot be determined how much of the WSA's existing potential resource (less than 10 million barrels of in-place oil or less than 60 billion cubic feet of in-place natural gas) occurs within the area that would be designated wilderness under this alternative. Therefore, it is assumed that the resources lost would be in direct proportion to the size of the area designated. Using this assumption, exploration and development of a potential in-place resource of about 3.3 million barrels of oil or about 20 billion cubic feet of natural gas (less than 1 million barrels of oil or 6 billion cubic feet of gas that is recoverable) could be foregone.

The oil and gas leasing management within the nondesignated portion of the WSA would remain Category 2. The wilderness stipulations on post-FLPMA leases would be removed and the estimated 6.7 million barrels of in-place oil (2 million barrels considered recoverable) and approximately 40 billion cubic feet of in-place gas (12 billion cubic feet considered recoverable) could be explored and developed without concern for wilderness values. However, due to the predicted small scattered deposits and the rugged terrain, indications are that major development would be unlikely.

Oil Shale

Because oil shale is unlikely to occur in the WSA, no impacts would result from implementation of this alternative. The 5,760-acre oil shale withdrawal would be located in the designated portion of the WSA and would have no effect, due to wilderness limitations.

Coal

A 25,540-acre area of known recoverable coal has been identified in the WSA. Of that area, approximately 3,237 acres would be within the designated area and 22,303 acres would be within the designated area.

It is estimated that approximately 46 tons of in-place coal (23 million tons recoverable) exist within the designated portion of the WSA. This area could not be leased, and recovery of the potential resource would be foregone. It is estimated that up to 97 tons of in-place coal (48 million tons recoverable) exist within the nondesignated area. If leased in the future, this resource could be developed. It is questionable that coal development would occur in the WSA in the foreseeable future due to more favorable areas located in the region near the WSA; however, in the long term, the coal resource in the WSA could be more important.

Locatable Minerals

The nondesignated area (49,465 acres) would be open to future mining claim location. Four placer mining claims currently exist in this area and could be explored or developed without concern for wilderness values.

The designated area (23,140 acres) would be closed to mining claim location. As of November 1984, no claims exist within this area and 5,760 acres are closed to mining claim location. It cannot be determined how much of the potential in-place uranium/vanadium resource (less than 500 tons of uranium oxide) is within the area that would be designated wilderness under this alternative. Therefore, it is assumed that the amount of potential resource recovery lost would be in direct proportion to the size of the area designated. The greatest impact for minerals would occur if none of the locatable mineral resource were within valid claims at the time of designation. In this case, the potential for exploration and development of up to 160 tons of uranium oxide and vanadium could be foregone in the area that would be designated wilderness.

Because production of these metals is not currently occurring within the WSA and economic considerations (e.g., transportation, low potential, etc.) are unfavorable, it is unlikely that uranium development would occur even without partial wilderness designation. Therefore, it is concluded that this alternative would not result in any significant loss of economically recoverable minerals.

FLOY CANYON WSA

WILDLIFE

Wildlife could benefit from preservation of solitude and the reduction of potential mineral-related disturbance from 1,450 acres under the No Action Alternative to 993 acres with this alternative.

Approximately 18,104 acres within the designated area are considered crucial winter habitat and 1,120 acres are crucial yearlong habitat for bear, cougar, deer, and elk. Only 6 acres could be disturbed through mining exploration and development within the designated area. This disturbance would have only a short-term impact on these species while work was ongoing. Thus, with this alternative, wildlife species would benefit through protection of crucial habitat within the designated area.

Within the nondesignated area (49,465 acres), approximately 38,471 acres are considered crucial winter habitat and 880 acres are crucial yearlong habitat for the sensitive species mentioned previously. Up to 987 acres of mineral-related surface disturbance could occur in this portion of the WSA, and at least some of the disturbance could occur within crucial habitat, thus reducing this area. Noise and increased access due to development of roads could, in combination with loss of habitat, cause species sensitive to human intrusion (bear, cougar, deer, and elk) to leave the area at least for the duration of the activities. Less mobile animals would remain but at reduced population levels. The 205 acres of vegetation treatment would have little impact to wildlife.

In the designated area, the one endangered and four candidate species, if present, would receive the added protection from wilderness restrictions, while in the undesignated area these species would not have this added protection. The Endangered Species Act provides protective provisions for such species in all areas.

FOREST RESOURCES

With this alternative, harvest of most of the WSA's forest products (8,802 cords of firewood) would be allowable, but would probably not occur due to limited potential within the WSA and the availability of more assessable woodland products elsewhere in the vicinity.

Disturbance of up to 1,198 acres from mineral development and vegetation manipulation would result in impacts to less than 2 percent of the forest resource in the WSA. No effect on resource development would be expected.

LIVESTOCK

In both the designated and nondesignated portions of the WSA, grazing use would continue as authorized in the Grand RMP. Of the 2,825 AUMs presently allocated in the WSA, 890 would be within the designated portion and 1,935 within the nondesignated portion. In the designated portion, development of future roads or other livestock management facilities for use with the 890 AUMs would be restricted to preserve wilderness values. Approximately 4 miles of vehicular ways in Floy Canyon, 2 miles in Thompson Canyon, and 5 miles in the Ute Canyon area would be in the designated wilderness and would be generally unavailable for vehicular access. Because little vehicular use to manage cattle is currently taking place in this area, an ORV closure within the designated wilderness (which includes the above-mentioned vehicular ways) would have little effect on existing livestock management practices in the area. Approximately 700 acres of planned burning in Tom Farrer Valley and Floy Canyon would not occur and the potential for approximately 87 additional livestock AUMs would be foregone.

In the 49,465-acre nonwilderness area, about 205 acres of burning in Floy Canyon would be allowed. As many as 27 additional livestock AUMs could be provided. Approximately 13 miles of existing vehicular ways could be used for livestock management, and new roads and rangeland improvements could be developed without wilderness considerations. None are planned.

VISUAL RESOURCES

Wilderness designation of a portion of the WSA would contribute to the preservation of the area's visual quality. In the designated portion the potential for surface-disturbing activities (6 acres) that could impair visual quality would be limited through management under VRM Class I, which generally allows for only natural ecological change. If the 6 acres of disturbance were to occur in the form of roads, VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected on less than 6 acres. Exploration of locatable minerals is not considered likely and no significant loss of visual quality in this portion as a whole would be expected.

Within the nondesignated area, VRM objectives of Class II on 44,385 acres and Class IV on 5,080 acres would be applied to help limit visual impacts

from surface-disturbing activities. Although mitigating measures would be applied on as much as 1,192 acres to reduce visual contrast, visual quality would be degraded and VRM Class II objectives would probably not be met during the short term. With rehabilitation, VRM objectives would probably eventually be met for most of the WSA but, even after rehabilitation, some permanent localized degradation could be expected. If roads, drill pads, and land stripping occurred throughout the nondesignated area, visual quality could be reduced in this portion of the WSA as a whole. This magnitude of disturbance in the WSA is unlikely in the foreseeable future, however, because mineral interest in the surrounding areas is higher.

CULTURAL RESOURCES

The protection afforded by wilderness management on 23,140 acres would outweigh any potential vandalism problems due to increased recreation use, and the overall impact would be positive. As much as 6 acres would be disturbed by mineral exploration and development in the area that would be designated wilderness; however, inventories for cultural resources conducted prior to these activities would identify those sites involved and would mitigate any adverse impact to them. Inadvertent loss or damage to cultural resources could occur; however, it is expected to be minimal in the designated portion.

Inventories for the purposes of site recordation and mitigation of impacts would take place prior to any and all proposed surface disturbance in the 49,465-acre nondesignated area. However, the area could receive as much as 1,192 acres of surface disturbance and, therefore, the potential for inadvertent loss of cultural values would be greater in this portion of the WSA than in the designated portion. Overall impacts are not known due to incomplete inventory of sites at this time; however, due to available mitigative measures, major adverse impacts are not expected.

RECREATION

Primitive recreation use probably would increase, but not as much as under the All Wilderness Alternative. Present recreation use is low (less than 200 visitor days) with most occurring from hunting in the designated portion. Total use levels for the WSA with partial designation would be expected to increase to as much as 2,314 visitor days/year. This assumes use density would be about 0.1 visitor day/designated acre.

Impacts on recreational values and opportunities for the 23,140-acre area that would be designated

would be as described for the All Wilderness Alternative. Outstanding primitive recreational opportunities would be recognized, managed, and protected. The 23,140-acre area, including approximately 11 miles of vehicular ways, would be closed to ORV activity. Because little, if any, ORV play use occurs in the area and most hunting access is via horseback, the ORV closure would have little effect on vehicular use for recreational purposes. Mineral-related surface disturbance on up to 6 acres in the area that would be designated could cause localized impairment of recreational values.

In the area that would not be designated (49,465 acres), little change in recreational use is expected. Mineral and energy exploration and development activities and vegetation treatments on up to a total of 1,198 acres would degrade or destroy primitive recreational values in the affected areas and possibly in the area as a whole in that portion of the WSA. Vehicular use would be allowed on the approximately 13 miles of vehicular ways in the nondesignated portion of the WSA and new access could be developed. This would maintain and possibly improve access into the area for hunting and other recreational purposes. The quality of hunting might, however, be reduced due to reduced habitat from mineral development and from increased hunting pressure. This latter impact could also affect the designated portion.

It is concluded that primitive recreation opportunities would benefit from partial wilderness designation of the Floy Canyon WSA. Within the nondesignated area, however, primitive recreation values could be lost or reduced due to potential disturbance.

WILDERNESS VALUES

On the 23,140 acres that would be designated wilderness, impacts to wilderness values would be the same as for the All Wilderness Alternative. Naturalness, outstanding opportunities for solitude and primitive recreation, and special features, all found throughout the 23,140 acres, would be protected. This area includes many of the high quality scenic areas (one of the special features) in the WSA. It is not known to what extent cultural values (also a special feature) are included. Although recreational use could increase, use relative to the size of this area would be low and no significant impacts on solitude or primitive recreation values would be expected. There would be a slight loss of wilderness values due to allowable surface disturbance from localized mineral exploration on up to 6 acres within

FLOY CANYON WSA

the designated portion. Additionally, sights and sounds of activities in the 49,465-acre area that would not be designated could result in loss of solitude and primitive recreation values in the adjacent designated portion of the WSA.

In the 49,465-acre area that would not be designated, there could be up to 987 acres of surface disturbance from mineral and energy exploration and development and 205 acres of disturbance from vegetation treatments. These activities could reduce or eliminate naturalness and primitive recreation (49,465 acres meet the standard), opportunities for solitude (45,835 acres meet the standard), and special features (including scenic, cultural and wildlife habitat values) in this portion of the WSA as a whole, especially if much of the disturbance involved roads.

LAND USE PLANS AND CONTROLS

Designation of wilderness acreage would not be in keeping with Grand County goals of maximizing mineral development. Because State lands within the wilderness portion of the WSA would be exchanged for lands outside the wilderness area, wilderness designation of 23,140 acres would not conflict with the policy of the State of Utah to maximize economic returns.

The BLM Grand RMP does not provide for wilderness designation, and a decision by Congress to designate 23,140 acres as wilderness would be an amendment to the RMP.

The 160-acre private in-holding would be in the nondesignated portion of the WSA and would not affect wilderness manageability.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be losses in Federal revenues currently provided by resource uses in the WSA (refer to Table 10) as well as loss of potential increases in local income and Federal revenues that could otherwise occur with the No Action Alternative.

The probability of mineral development in the WSA is moderate to low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but

could alter future economic conditions derived from mineral resources in the designated portion.

In 1980, approximately 0.001 people per acre were employed in the exploration and production of oil and gas from the most productive region in Grand County. The implication is that 22 jobs would be foregone with designation of 23,140 acres. There are numerous existing leases in the vicinity that could still be developed with designation; therefore, the potential loss of local employment would probably be less. However, any local income related to assessment of future mining claims on 17,380 acres would be lost.

Livestock use and ranchers' income would continue as at present with up to \$56,500 of livestock sales including \$14,125 of ranchers' return to labor and investment. Proposed improvements for livestock would not be totally foregone as potential vegetation treatment on 205 of 905 acres in the WSA would be located outside of the designated wilderness area and could be completed. If these treatments were to be implemented, 26 additional AUMs would be generated and ranchers' returns to labor and investment would increase by \$130.

Increased public awareness of the area resulting from wilderness designation of 23,140 acres could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day) and would total \$9,487 annually. Motorized recreational use of the WSA is light and closure of the wilderness portion of the WSA to ORV use would result in an insignificant decrease in related local expenditures. Overall, the change in recreation expenditures would be distributed locally and regionally, and would not be noticeable as local income.

In the designated part of the WSA, the loss of up to 17,935 acres now leased for oil and gas would cause an eventual loss of up to \$53,805 per year of lease fees to the Federal Treasury, unless development in that area occurs on leases held by production or unit agreement. There would also be a potential loss of up to \$15,615 annually in Federal revenues from the 5,205 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGSS could be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation. Recreation-related Federal revenues could increase if the demand for commercial outfitter services occurs.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David T. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Milton, Bob. 1982. "Comparison of Uses in Proposed and Existing Wilderness Areas" (unpublished document). January 1982. U.S. Department of the Interior, Bureau of Land Management, Moab District Office, Moab, Utah.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah" (unpublished document). Cambridge, Massachusetts.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. October 1979. Salt Lake City, Utah.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1972. "Grand Resource Area Unit Resource Analysis" (unpublished document). January 12, 1972. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and

FLOY CANYON WSA

- Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981a. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981b. "Book Mountain Transportation Plan" (unpublished document). December 1981. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Management Plan, Final Environmental Impact Statement*. December 1983. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. "Recoverable and In-Place Coal Values for Floy Canyon Wilderness Study Area" (unpublished document). November 16, 1984. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1977. *Energy Resources Map of Utah*. Utah Geological and Mineral Survey Map No. 44. Salt Lake City, Utah.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January, 1982. U.S. Government Printing Office, Washington D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation. Salt Lake City, Utah.
- Utah Department of Wildlife Resources. 1981. "Inventory of Unique and Endangered Terrestrial Wildlife Species of the Grand Resource Area" (unpublished document). November 1981. Contract No. 4A-553-CTD-1023. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Grand Resource Area, Moab, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Recreation Plan, 1980* Salt Lake City, Utah.

FLOY CANYON WSA

Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wil-

derness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Coal Canyon
WSA



COAL CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	4
Alternatives Considered and Eliminated from Detailed Study	4
Alternatives Analyzed	4
No Action Alternative (Proposed Action)	6
All Wilderness Alternative	6
Summary of Environmental Consequences	8
AFFECTED ENVIRONMENT	8
Air Quality	8
Geology	10
Soils	10
Vegetation	10
Water Resources	11
Mineral and Energy Resources	11
Wildlife	14
Forest Resources	15
Livestock and Wild Horses/Burros	15
Visual Resources	15
Cultural Resources	16
Recreation	16
Wilderness Values	16
Land Use Plans and Controls	17
Socioeconomics	18
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	19
Analysis Assumptions and Guidelines for All Alternatives	19
No Action Alternative (Proposed Action)	20
All Wilderness Alternative	23
BIBLIOGRAPHY	29

COAL CANYON WSA (UT-060-100C2)

INTRODUCTION

General Description of the Area

Coal Canyon Wilderness Study Area (WSA) is located in the Book Cliffs region of north-central Grand County. It contains 61,430 acres of BLM-administered lands, including a 17,615-acre portion that was added to the WSA following a remand decision by the Interior Board of Land Appeals (IBLA). The WSA is of rectangular configuration, roughly 16 miles east-west and 12 miles north-south.

The WSA lies about 10 miles northwest of Interstate Highway 70 (I-70). The nearest towns are the small communities of Thompson and Cisco, Utah (about 10 miles south and 15 miles southeast, respectively, of the WSA) and Mack, Colorado (about 20 miles southeast). Coal Canyon is adjoined by two WSAs: Flume Canyon and Spruce Canyon.

The WSA has a semiarid desert climate. Dominant vegetation types are Douglas fir forest, pinyon-juniper-Douglas fir-mountain shrub, pinyon-juniper, and riparian-sagebrush. Average annual precipitation ranges from 12 to 17 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F.

Coal Canyon WSA lies entirely in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading north to Cottonwood Canyon along the northern boundary of the WSA, east to Spring Canyon or Coal Canyon, or south to Nash Wash. Elevations range from 8,900 feet along Cottonwood Point in the northwestern part of the WSA to 5,200 feet at the mouth of Coal Canyon in the eastern end of the WSA. The 400-foot face of the lower Book Cliffs, visible for miles from I-70, lies just south of the WSA. The 1,000-foot cliff of the upper Book Cliffs escarpment forms the southern boundary of the eastern end of the WSA.

Specific Issues Identified in Scoping

General issues pertaining to more than the Coal Canyon WSA are discussed in Volume I. Twenty specific issues pertaining to the Coal Canyon

WSA were identified through the public scoping process (USDI, BLM, 1984) and are responded to below.

1. *Comment:* How would watershed resources be affected by nondesignation? A dollar value should be given for resources that are protected and enhanced by wilderness in comparison to potential jobs and listed lost lease royalties.

Response: As stated in the Water Resources section for the No Action Alternative, sediment increases could result from potential surface disturbance. Proposed watershed treatments and in-stream drop structures to control sediment could be implemented under this alternative. BLM does not believe that a cost-benefit analysis, or any other comparison based solely on economic considerations, can properly portray trade-offs involved. This is because: (1) many of the values related to wilderness are intangible; (2) market conditions which affect consumptive resources are highly variable over time; (3) the wilderness study criteria do not lend themselves to cost-benefit interpretations; and (4) the numerous and divergent factors that contribute to wilderness considerations would make a meaningful cost-benefit analysis very difficult, if not impossible. BLM believes that it can serve best by narrating the situation and offering a recommendation that can be pursued in the political and legislative forums.

2. *Comment:* The Book Cliffs roadless areas are the most important BLM-managed wildlife habitat in the State. Are these same roadless areas the most important oil and gas areas in the State?

Response: The Book Cliffs area, from Colorado west to the Green River, has become an



active oil and gas exploration and development area. The WSA itself contains a portion of two Known Geologic Structures (KGSs) and portions of 64 oil and gas leases, at least 26 of which are currently producing. Thus, the WSA is an important management area for not only wildlife, watershed, and recreation but the oil and gas resource as well.

3. *Comment:* Is it an analysis assumption in the Site-Specific Analysis (SSA) that Congressional designation could override specific management actions?

Response: Specific analysis assumptions are presented for all alternatives. Assumption No. 4 states: "The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses." (Refer to Analysis Assumptions and Guidelines for All Alternatives, Environmental Consequences section.) Therefore, it is possible that wilderness designation would override or modify specific management actions.

4. *Comment:* How would livestock grazing be impacted if this WSA were not designated wilderness?

Response: As indicated in the impact analysis for Livestock under the No Action Alternative, domestic livestock grazing would continue at 2,562 Animal Unit Months (AUMs). New developments could be implemented if in accordance with BLM's land use plans. If the potential surface disturbance were to occur, especially in the form of roads or drill pads, there could be a temporary loss of vegetation and available AUMs. However, this would be offset by the increased AUMs resulting from the proposed 346-acre burning and seeding.

5. *Comment:* The Draft SSA failed to quantify statements but uses "numerous, high, low, lack of" etc.

Response: This document provides quantification, when possible, to terms such as low, moderate, numerous, etc. For some resources, actions, or anticipated impacts quantification is not possible, resulting in qualitative statements.

6. *Comment:* What assumptions were used for the SSA analysis? How was "No Action" incorporated into "No Wilderness?"

Response: In this document "No Action" is taken to mean no action by Congress to designate wilderness. The No Action Alternative incorporates impacts that would occur in the area if it were not designated wilderness. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These descriptions and assumptions can be found in the Description of the Alternatives section.

7. *Comment:* In the SSA, the analysis of impacts to energy and critical resources failed to quantify or state how there would be adverse impacts when the economic feasibility of development (meeting the prudent man test) is remote. The mere presence of pre-FLPMA (Federal Land Policy and Management Act) oil and gas leases is not sufficient cause to eliminate the WSA. The analysis should indicate the need and potential for minerals.

Response: Mineral potential of the WSA is discussed in terms of known or predicted in-place and recoverable resources. The impact analysis for minerals associates these resources and each alternative in terms of that amount that can be developed and that amount foregone. The possibility of mineral development is estimated in the Mineral and Energy Resources sections of this document.

8. *Comment:* The analysis should consider minerals and other resources available outside the WSA and the effect of lost lease royalties on local socioeconomics.

Response: The Affected Environment section of this document discusses the resources within the WSA and, in some cases (i.e., minerals, wildlife, etc.), resources surrounding the WSA. The impact analysis focuses on those resources that would be influenced by each alternative and the differences that could occur between alternatives. These differences would be within the WSA. The possible loss of lease royalties is discussed under the Socioeconomics impact analysis of the All Wilderness Alternative.

9. *Comment:* Do questionable low to medium oil and gas potential and moderate coal tonnage outweigh wilderness values?

Response: Impacts to each resource are analyzed under each alternative. The final judgment as to which resource outweighs other resources will be made by Congress.

COAL CANYON WSA

10. *Comment:* What criteria and systematic analysis were used to evaluate the relative values of competing resources? These factors must be applied consistently in all the SSAs.

Response: Each resource is evaluated in relation to its existing situation and the possible impact each alternative would have on that situation. The methodology used to evaluate the different resources were consistently applied to all WSAs.

11. *Comment:* Would there actually be a problem of manageability with respect to pre-FLPMA oil and gas leases?

Response: The affect that wilderness designation and nondesignation would have on pre-FLPMA leases is discussed in the Mineral and Energy Resources sections of this document. Upon expiration, leases would not be reissued in a designated wilderness area unless a find in commercial quantities has been made. Therefore, it is unlikely that pre-FLPMA oil and gas leases would be reissued after expiration or that there would be a wilderness manageability problem. Overall manageability of each WSA is addressed in Volume I.

12. *Comment:* Cost-benefit analyses are needed to identify wilderness economic trade-offs.

Response: Refer to the response to the first comment.

13. *Comment:* What local economic effects would wilderness designation create?

Response: Local economic impacts of wilderness designation would be expected to be minor and are discussed in the Environmental Consequences, All Wilderness Alternative section.

14. *Comment:* Would wilderness designation be consistent with local and State land use planning?

Response: State and local land use plans are discussed under each alternative. Wilderness designation generally would not be consistent with the Grand County policy of maximizing mineral development. Because State in-holdings would be exchanged, wilderness designation would not conflict with the State policy of maximizing economic returns.

15. *Comment:* Maps and charts in the SSA are poorly defined and difficult to interpret.

Response: The maps in this document have been redrafted to more clearly show land status and WSA boundaries.

16. *Comment:* What would happen to permittees' forage if full-scale development were to take place?

Response: As identified in the impact analysis section under the No Action Alternative, potential surface disturbance would have a negative effect on vegetation and livestock. An undetermined number of AUMs could be lost until revegetation of disturbed areas was completed. However, AUMs lost would be expected to be minor.

17. *Comment:* Worst-case analysis in the SSA was applied in a biased manner. Because only 0.1 visitor day per acre is predicted, any increase in popularity of the region was discounted.

Response: Visitor use increases are based on documented studies of recreation trends and statistics for existing wilderness areas and similar natural parks or recreation areas. Refer to the Environmental Consequences, Recreation sections for both alternatives for a discussion of projected visitor use increases.

18. *Comment:* The recreation opportunities discussion in the SSA did not use BLM's own Recreation Opportunity Spectrum (ROS). Descriptions are not experience oriented.

Response: The recreation opportunities discussion covers those recreation activities currently occurring within the WSA and those opportunities possible within the WSA. Experience-oriented descriptions of recreational opportunities can be found in the discussion of the Affected Environment. These descriptions are discussed in terms of primitive values and opportunities where recreationists can find solitude, recreation, and special features. For a more complete ROS discussion on experience-oriented recreation opportunities, refer to the Grand Resource Area Resource Management Plan (RMP) (USDI, BLM, 1983).

19. *Comment:* The compatibility between wilderness and the multiple-use concept should be discussed.

Response: The All Wilderness Alternative clearly discusses any restrictions that would be imposed as a result of wilderness designation. These restrictions are compared to the

COAL CANYON WSA

existing situation and the No Action Alternative.

20. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

During early studies BLM considered an alternative to designate the Coal Canyon WSA as an Area of Critical Environmental Concern (ACEC). This alternative was not pursued because other BLM management options allow for protection of the particular resources of concern (i.e., watershed and wildlife).

No alternatives were identified for this WSA during EIS scoping other than those analyzed. A partial alternative was not identified because natural features and potential conflicts occur consistently throughout the WSA.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (61,430 acres). Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE (PROPOSED ACTION)

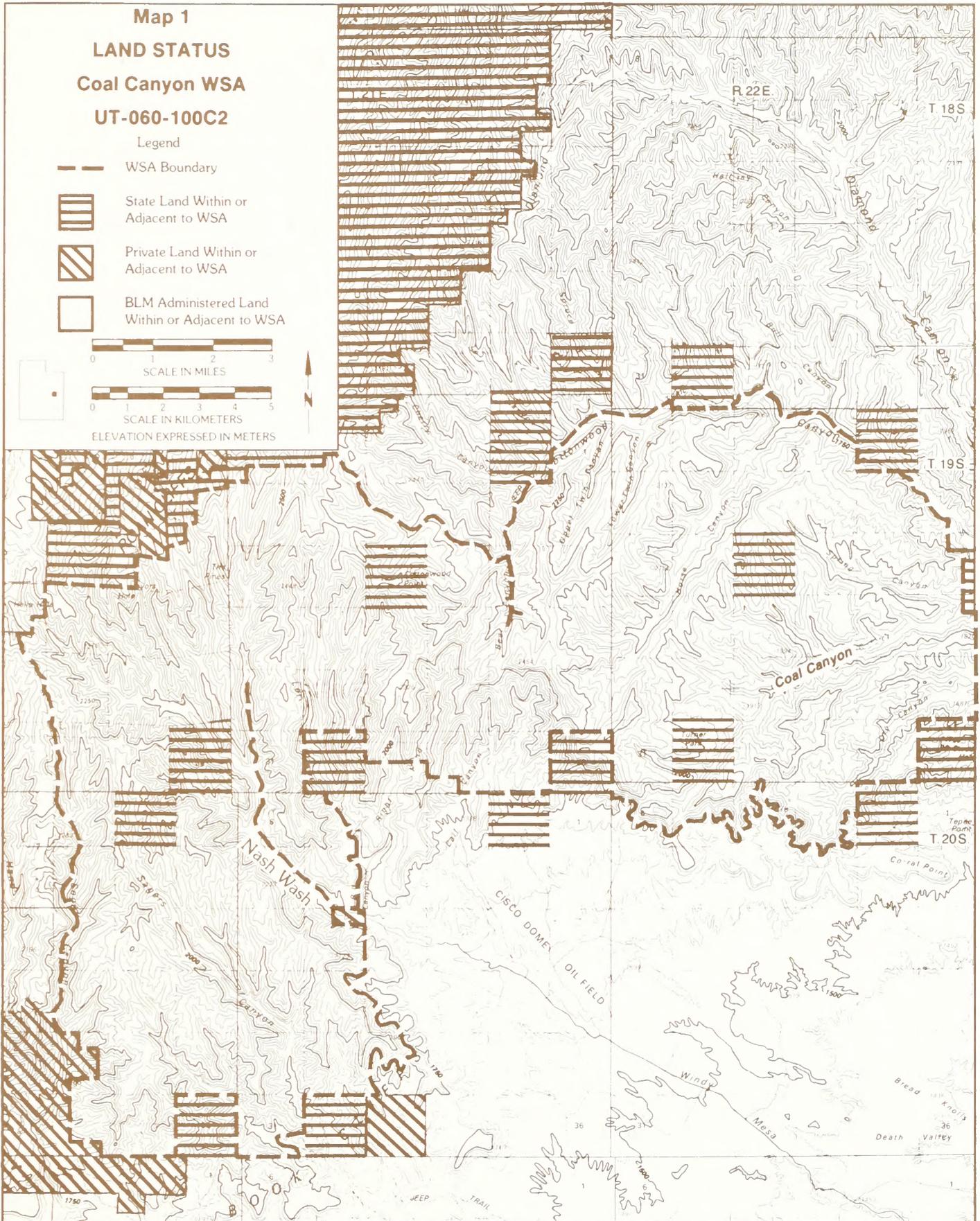
Under this alternative, none of the 61,430-acre Coal Canyon WSA would be designated by Con-

gress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed for multiple uses in accordance with the Grand Resource Area RMP. Five sections (3,116.36 acres) of State lands within the WSA (refer to Map 1) have not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership.

The following are specific actions that would take place under this alternative:

- Approximately 54,390 acres would remain open to mineral location (no mining claims are existing). The remaining 7,040 acres are covered by an oil shale withdrawal and would remain closed to mineral entry. Development work, extraction, and patenting would be allowed on any future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without consideration for wilderness values.
- Existing oil and gas leases could be developed on 43,922 acres under Category 1 (standard stipulations). New leases could be issued under Category 1 on 1,400 acres and under Category 2 (standard and special stipulations) on 60,030 acres (including lands in the WSA where existing leases may expire) without concern for wilderness value. The special stipulations would restrict the use to protect watershed and wildlife.
- Domestic livestock grazing use of the Coal Canyon WSA would continue as authorized in the Grand RMP (currently 2,562 AUMs). Existing range developments (short-gap fences) could be used and maintained, and new range developments (a 346-acre proposed burning-and-seeding project) could be implemented without wilderness considerations.
- Development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the BLM planning documents. In-stream drop structures are planned for Horse and Cottonwood Canyons to improve water quality. Gully plugs, contour furrows, and retention dams are planned in the Sagers and Cisco watersheds to help reduce downstream salinity. Other watershed treatments could be implemented.

COAL CANYON WSA



COAL CANYON WSA

- The entire WSA acreage would continue to be open to off-road vehicle (ORV) use and four ways totaling 8 miles would remain open to vehicles.
- Pipeline rights-of-way could be issued if needed for oil and gas development.
- The entire 61,430-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire 61,430-acre area would continue to be managed under Visual Resource Management (VRM) Class II.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources. Except for the northeast corner where the prescribed burn is planned, the entire area would be managed under a limited fire suppression policy.
- Activities to gather information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

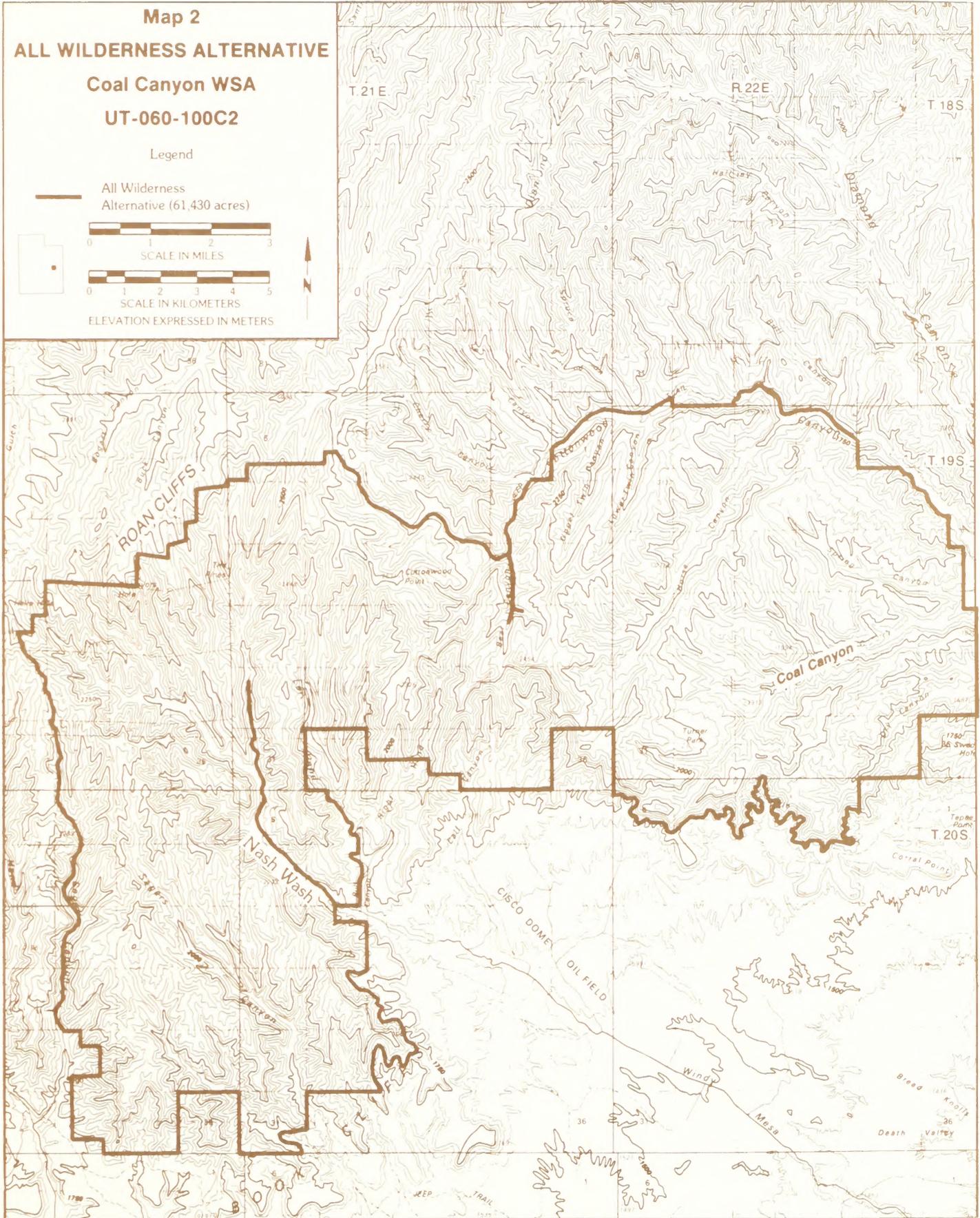
Under this alternative, all 61,430 acres of the Coal Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character. Upon designation, five sections (3,116.36 acres) of State land within the WSA and two sections (1,281.74 acres) adjacent to the WSA (refer to Map 1) would be transferred to Federal ownership by purchase or exchange. Private land and 10 sections of State land adjacent to the WSA would not be exchanged. (Refer to Volume I for a further discussion on State lands.) The figures and acreages given under this alternative are for Federal lands only. Private lands exist in two locations adjacent to the WSA (refer to Map 1) but

there are no private or split estate lands located within the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 61,430 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. There are no existing mining claims; therefore, no mining activities would be allowed. Existing oil and gas leases on 43,922 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. No new oil and gas leases would be issued.
- Present domestic livestock grazing would continue as authorized in the Grand RMP and related Allotment Management Plans (AMPs). The 2,562 AUMs in the WSA would remain available to livestock as presently allotted. After designation existing rangeland developments (short-gap fences) could be maintained in the same manner as in the past based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. It is likely that the planned burning-and-seeding project on 346 acres would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). The planned in-stream drop structures and gully plugs likely would not be allowed unless designed to blend with the wilderness environment and constructed of natural materials by hand methods. The contour furrows and retention dams likely would not be allowed.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA and none are specifically

COAL CANYON WSA



COAL CANYON WSA

- planned, other than the burning-and-seeding project noted in the livestock discussion above.
- The entire 61,430-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. Four vehicular ways totaling 8 miles would be closed. About 14 miles of road or jeep trail border the WSA and roads would be "cherry-stemmed" in two locations (5 miles in Nash Wash and 1.3 miles in Bear Canyon). These roads would remain open to vehicle use.
 - A specific Wilderness Management Plan would be developed to govern use and protection of the 61,430-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to or dead-ended at the WSA for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
 - No pipeline rights-of-way would be issued except as may be related to pre-FLPMA oil and gas leases.
 - Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
 - Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
 - Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to aerial or hand techniques.
 - Any activity to gather information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
 - Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
 - Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 presents the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA has a Prevention of Significant Deterioration (PSD) Class II air quality classification as per the 1977 Clean Air Act Amendments. The nearest Class I area is Arches National Park, about 30 miles south. Canyonlands National Park, another Class I area, lies about 60 miles southwest. No significant sources of air pollution are close enough to affect the WSA and overall air quality is good. Visibility from higher elevations of the WSA is important because of scenic vistas from the WSA across the Book Cliffs and Cisco Desert. Median visual range is about 123 miles (Aerocomp, Inc. 1984).

COAL CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
COAL CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (61,430 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 80 million tons of coal, and 500 tons of uranium oxide.	Oil, gas, and coal likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 1.4 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 2,562 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of 346 acres of land treatment, could be implemented to produce 43 additional AUMs of forage.	Grazing of 2,562 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed. The 346 acres of land treatment would not be allowed and 43 potential AUMs would be foregone.
Visual Resources	The quality of visual resources could be impaired on up to 870 acres.	Visual quality could be impaired on up to 160 acres.
Recreation	ORV use would continue on 8 miles of ways at current levels. Overall recreational use could increase from the present 500 visitor days per year to 745 over the next 20 years. Up to 870 acres of mineral-related disturbance and 346 acres of land treatments could reduce the quality of primitive recreation.	The WSA, including 8 miles of ways, would be closed to ORV use. Primitive recreational use could increase to about 6,143 visitor days annually due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 870 acres (1.4 percent of the WSA).	Wilderness values would be protected, except on up to 160 acres (less than 0.3 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would not be inconsistent with the <i>Grand County Master Plan</i> , which does not provide specific recommendations for the WSA. It would be consistent with State plans and policies and the current BLM Grand RMP.	This alternative would not be consistent with Grand County's concept of multiple use. It would be consistent with State plans if lands were exchanged and would complement the adjacent State roadless area. Designation would constitute amendment of the BLM Grand RMP.
Socio-economics	Annual local sales of less than \$53,290 and Federal revenues of up to \$135,403 would continue. An additional \$52,524 per year in Federal revenues could be derived from leasing of presently unleased areas. AUMs from proposed land treatment would lead to an increase of \$860 per year in local livestock sales and \$60 of Federal grazing fees.	Annual local sales of less than \$53,290 and Federal revenues of up to \$69,353 would continue, but Federal revenues of up to \$118,524 would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA. Potential increases in local livestock sales and Federal revenues from land treatments would be foregone.

COAL CANYON WSA

Geology

The WSA is in the Book Cliffs, a physiographic feature which runs from east of Grand Junction, Colorado to northwest of Green River, Utah. It is part of the Uinta Basin Section of the Colorado Plateau Physiographic Province.

The WSA lies along the south-facing Book Cliffs escarpment, with part extending northward towards the Roan Cliffs. Elevations range from 5,200 feet at the mouth of Coal Canyon in the eastern end of the WSA to 8,900 feet along Cottonwood Point in the northwestern part of the WSA. The tract is underlain by sedimentary rocks of Cretaceous and Tertiary Age. At the base of the tract along its southeastern side, the Mancos Shales and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River Formations. In the northwestern part of the WSA, the oil-shale rich Parachute Creek Member of the Green River Formation crops out in an irregular band. All strata in the vicinity of the WSA dip gently northward to the Uinta Basin.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Cedar Mountain, Entrada, and Navajo. The Morrison and Chinle Formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth, but indications are that ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation.

Differential erosion of the layers of sandstones and shales has created the distinctive banded appearance characteristic of the Book Cliffs. In the higher elevations towards the Roan Plateau, slopes lose the steep appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Soils

This WSA contains five general soil mapping units running in broad bands southwest to northeast across the WSA. The Coal Canyon WSA is characterized by steep canyon sides. About 40 percent of the area is composed of shallow and deep stony soils on steep sides of canyons. The

overall soil characteristics are shown on Table 2. Erosion throughout the WSA is critical because of steep slopes and a tendency towards erosion due to flash flooding. Erosion is generally natural in origin, occurring from both wind and water. Table 3 indicates erosion condition for the WSA.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Type	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	20	12,286	0	0
Shallow loamy soils on sloping cuestas and structural benches	10	6,143	1	5
Shallow and deep stony soils on steep canyon and mountain sides	40	24,572	1	10
Moderately deep and deep loamy soils on steep mountain sides	10	6,143	1	20
Very deep loamy soils on sloping alluvial fans and floodplains	20	12,286	0.1	1
Totals	100	61,430		

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss If Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20	0	0	0	10	6,143	122,860
High	10	0	0	0	40	24,572	245,720
Medium	5	0	0	0	10	6,143	30,715
Low	1	60	36,858	36,858	20	12,286	12,286
Very Low	0.1	20	12,286	1,229	0	0	0
None	0	20	12,286	0	20	12,286	0
Totals		100	61,430	38,087 ¹	100	61,430	411,581 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.62 under present conditions; 6.7 if disturbed.

Vegetation

Existing vegetation is predominantly pinyon-juniper woodland of varying density, with high desert plant communities found along the lower elevations in the southern portion of the WSA. Mountain shrub communities are found along

COAL CANYON WSA

ridgelines towards the Roan Cliffs, especially on north-facing slopes. Some ponderosa pine, Douglas fir, aspen, cottonwood, and box elder are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs. Riparian-sagebrush communities cover approximately 4 percent of the WSA and occur in the canyon bottoms. Vegetation communities are localized depending on elevation, availability of water, and slope aspect. There are no known threatened or endangered plant species in the WSA. Table 4 lists existing vegetation types of the WSA.

The Coal Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir forest	6,030	10
Pinyon-juniper/Douglas fir/mountain shrub	47,229	77
Pinyon-juniper	4,914	8
Riparian/sagebrush	2,457	4
Shadscale/Salina wildrye	800	1
Total	61,430	100

Source: USDI, BLM, 1972.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Juniper-pinyon woodland	44,229	72
Saltbush-greasewood	17,201	28
Totals	61,430	100

Source: USDI, Geological Survey, 1978.

Water Resources

The major drainages in this WSA are Cottonwood Canyon, along the northern border; Horse, Coal, and Spring Canyons in the eastern half; and the upper forks of Bull Canyon and Nash Wash in the western portion. Cottonwood Creek is a perennial stream flowing for approximately 8 miles along

the northeast boundary of the WSA. All other canyons have intermittent streams. Sections of Cottonwood Creek have been identified as damaged by floods and contributing to sediment damage. The potential exists for watershed treatments to minimize downstream damage. Adjacent areas contributing to sediment and runoff would also be considered for treatment. In-stream drop structures are planned for Horse and Cottonwood Canyons to improve water quality. Gully plugs, contour furrows, and retention dams are planned in the Sagers and Cisco watersheds to help reduce downstream salinity.

There are no developed springs within the WSA although geologic conditions are favorable for natural springs and seeps. In the far western half of the Coal Canyon WSA, 22 unnamed springs have been inventoried. No springs or wells have yet been inventoried in the central or eastern sections of the WSA. The two major geologic formations in which the 22 inventoried springs are located also exist in the central and eastern areas of the WSAs. This situation presents a strong probability that additional seeps and springs would be found once an inventory is undertaken. Water quality in the known springs is very good.

Surface water quality for Cottonwood Creek is considered reasonably good based on samples obtained at the Irrigation Division downstream from the WSA. The highly saline Mancos Shale is only exposed in the very lower reaches of the WSA; therefore, for the most part, surface water quality in the WSA is acceptable for recreation, wildlife, livestock, and agricultural uses. Data are not available on the amount or quality of ground water in the WSA.

Mineral and Energy Resources

The WSA lies in an area known for hydrocarbon potential (oil and gas, coal, tar sand, and oil shale). Prospecting has occurred within the WSA for other minerals, including uranium and placer claims. No locatable minerals are known to have been recovered from the WSA.

The BLM, in cooperation with the U.S. Department of Energy, had each WSA within Utah assessed for its energy and mineral resources by SAI (1982). (Refer to Appendix 5 for a detailed description of the SAI rating system.) An overall importance rating (OIR) of 2+ was assigned to the Coal Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations

COAL CANYON WSA

for a tract with other data, such as gross economics or the relative availability of the resources, into a summary number that reflects an overall assessment of the resource importance of the WSA. The energy and mineral resource rating for this WSA is given in Table 6.

If the Coal Canyon WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA (Federal Emergency Management Agency, 1983).

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c3	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c2	Less than 10 million barrels
Oil Shale	f2	c4	Less than 10 million barrels
Uranium/Vanadium	f2	c2	Less than 500 tons of uranium oxide
Coal	f3	c4	80 million tons
Geothermal	f1	c3	None
Hydroelectric	f1	c4	None
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

The WSA lies along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields producing from the Jurassic Entrada and Morrison Formations and the Cretaceous Cedar Mountain and Dakota Formations. Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA.

The interior of the WSA has been drilled, but none of the wells have been produced. Two of the wells are shut-in gas wells and one well has been plugged and abandoned. A major oil and gas field is located 10 miles southeast of the WSA.

Approximately 50 holes have been drilled for oil and gas within 10 miles of the WSA. Twenty of these wells have been plugged and abandoned. The remainder of the wells are oil and gas producers. Of these, approximately 80 percent are gas wells and 20 percent are oil wells.

Leasing and drilling activity has been high. Some of the fields on the perimeter of the WSA include the Book Cliff, Left Hand Canyon, Bull Canyon, and Cisco Dome Fields. The largest fields in the vicinity of the tract are located 10 to 15 miles northeast of the WSA. San Arroyo, the largest of the group, produced about 60 billion cubic feet of gas through 1974 since its discovery in 1962. Other relatively large fields in this area include Bar X (more than 50 billion cubic feet of gas produced) and Westwater (about 30 billion cubic feet of gas produced).

The SAI rating indicates that potential exists in the Coal Canyon WSA for less than 10 million barrels of oil and less than 60 billion cubic feet of gas with a future undiscovered potential in small, relatively shallow fields.

The WSA contains portions of 64 oil and gas leases covering 43,922 acres (over 71 percent of the WSA). At least 26 are producing leases (although not currently producing within the WSA). The remainder of the WSA, about 17,508 acres (29 percent), is unleased but potentially available for leasing. About 1,360 acres (2 percent) of the WSA is unitized. In addition to the unitized acreage, approximately 20,890 acres of the WSA are covered by pre-FLPMA leases which carry valid existing rights. Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Post-FLPMA leases (21,672 acres) and areas not leased (17,508 acres) carry a wilderness protection stipulation that operations must meet non-impairment criteria. Table 7 summarizes lease information.

TABLE 7
Oil and Gas Leasing Data

Type of Lease	Acres of WSA	Percent of WSA
Pre-FLPMA Leases	20,890	34
Post-FLPMA Leases	21,672	35
Available for Leasing	17,508	29
Subtotal	60,070	98
Under Unit Agreements		
1. Willow Creek East Unit (5/28/76)	720	1
2. Book Cliffs Unit (2/24/67)	640	1
Subtotal	1,360	2
Total	61,430	100

Source: USDI, BLM, 1975.

The WSA has portions of two known oil and gas fields known geologic structures (KGS) covering 7,209 acres (12 percent of the WSA). The WSA also contains all or parts of two oil and gas unit agreements. Unit agreements typically pool several oil and gas leases together. Such an agreement makes work done on any one lease within the unit area apply to all leases. This affects drilling required to extend leases. A well drilled outside of the WSA within a unit that straddled the

boundary would, therefore, convey lease extension rights to all leases within the unit, including those within the WSA.

Under the 1975 BLM oil and gas category system (USDI, BLM, 1975), all of the WSA originally was classified as Category 1 (standard stipulations), but has been reversed to the categories as shown in Table 8 as a result of the Grand RMP. The Category 2 classification would restrict winter use to protect critical watershed and elk habitat.

TABLE 8
Oil and Gas Leasing Categories

Category	WSA Acres	Percent of WSA
Category 1	1,400	2
Category 2	60,030	98
Category 3	None	0
Category 4	None	0
Total	61,430	100

Source: USDI, BLM, 1983.

Coal and Potash

Leasable mineral resources produced locally are coal and potash. The WSA has no potential for potash, because it is far north of the Paradox Basin where potash-bearing salts were deposited.

The rating for coal indicates that a moderate tonnage of coal exists within the WSA. The highest potential for coal is within the western and southern end of the WSA and about 16,935 acres are within the Thompson Known Recoverable Coal Resource Area (KRCRA) designated by the Geological Survey in 1978. Some 13,760 of these acres are considered to contain an in-place resource of 80 million acres of which 38 million tons could be recovered. The remaining acres in the KRCRA are not believed to contain recoverable coal. None of the WSA is currently leased for coal.

The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary Formations. The WSA is underlain by these strata, with coal bed outcrops in the southern border of the WSA. Most of the WSA lies within the Sego Coal Field, which is about 65 miles long, 6 miles wide, and extends from the Green River to the Colorado state line. The Sego Field comprises only a small part of the demonstrated coal reserve base of Utah, with recoverable reserves of the 293.6 million short tons of coal in beds of 4 or more feet thick. The Sego Field was mined from

COAL CANYON WSA

1912 to the early 1950s, but not within the WSA. A coal withdrawal is shown on some plats, but was revoked in 1982.

Tar Sand and Oil Shale

Two other hydrocarbon resources may exist in the WSA; however, neither have been leased and potential for development is considered very low due to unfavorable geologic conditions. These resources are tar sand and oil shale, rated within the WSA as having much less than 10 million barrels of oil in-place from tar sand (less than 3 million barrels recoverable) and less than 10 million barrels of oil in-place from oil shale (less than 3 million barrels recoverable). A Special Tar Sand Area (STSA) has not been established within the WSA. Approximately 7,040 acres of the WSA are under an oil shale withdrawal.

Geothermal

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees Centigrade [C]). It seems very unlikely, however, that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low-temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA.

LOCATABLE MINERALS

The WSA has been rated as having a low potential for uranium and negligible potential for other hardrock minerals. The uranium potential would be less than 500 tons of uranium oxide in a geologic environment only marginally favorable for the resource to occur.

The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, the other major uranium-producing zone regionally, lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. The Wasatch Formation contains small anomalous uranium deposits. Because the Wasatch Formation is present within the WSA, it may have marginal potential for uranium. Although some prospecting for placer gold deposits has occurred within the Book Cliffs region, there is no evidence of this type of activity within the WSA. The Coal Canyon WSA contains no mining claims. The 7,040 acres

of the WSA under oil shale withdrawal are closed to mineral location.

Wildlife

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, mountain lion, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food and cover.

The WSA supports moderate to high populations of big game species. Most common is mule deer. Approximately 415 to 425 animals inhabit the area, moving to lower elevations in winter. Elk can be found year-round: about 40 winter within the WSA. Black bear and mountain lion can also be found year-round. The WSA favors wildlife because of its relative lack of human impacts. Three species present are very sensitive to human intrusion: black bear, mountain lion, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species. Approximately 58,173 acres of the WSA are considered crucial winter range and 2,457 acres are crucial year-round habitat for deer, elk, and mountain lion.

Upland game found in the WSA include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffed grouse, and cottontail rabbit. A limited number of ducks inhabit Cottonwood Creek except in winter.

Cottonwood Creek is a perennial stream that has potential for supporting a population of trout. No game fish presently inhabit this stream. Several species of nongame fish (dace, shiners, suckers, and killifish) are present.

There are several species of reptiles and amphibians present. The most common are horned lizard, Great Basin sagebrush lizard, northern tree lizard, sideblotched lizard, whiptail lizard, gopher snake, smooth green snake, striped whipsnake and midget faded rattlesnake. Several species of amphibians such as the red-spotted toad, Rocky Mountain toad, Great Basin spade foot toad, canyon tree frog, and Utah tiger salamander could be present along the Cottonwood Creek drainage.

The most common birds in the WSA are red-tailed hawk, golden eagle, American kestrel, great horned owl, goshawk, sharp-skinned hawk, Cooper's hawk, blue jay, pinyon jay, sparrows,

COAL CANYON WSA

juncos, swifts, swallows, king birds, kinglets, nuthatches and magpies.

No wildlife transplants are planned in the WSA. There are no existing or proposed wildlife management facilities or habitat improvement projects planned within the WSA.

The endangered black-footed ferret may inhabit the WSA. Four candidate species (the ferruginous hawk, longbilled curlew, Southern spotted owl, and Western yellow-billed cuckoo) may also occur in the WSA.

Forest Resources

No forest harvest is known to have taken place within the WSA. Adequate volumes for timber harvest are present in most of the tree-dominated vegetation types and could produce limited amounts of pulp wood, saw timber, firewood, fenceposts or Christmas trees. However, slopes are prohibitive to production in most of the WSA, accessibility is very poor, distance to a mill is not favorable, and growth of trees is slow (50 to 75 years to produce 1-inch trunk development of Douglas fir). More suitable stands are available elsewhere and there is no commercial or non-commercial interest in forest products within the WSA. There are 6,030 acres of Douglas fir forest, 4,914 acres of pinyon-juniper woodland, and 47,229 acres of pinyon-juniper/Douglas fir/mountain shrub mix comprising 95 percent of the WSA in forest types. At present, approximately 58,173 cords of pinyon-juniper and 9,049 cords of Douglas fir firewood are potentially available.

Livestock and Wild Horses/Burros

The Coal Canyon WSA contains portions of seven grazing allotments and a total of 2,562 AUMs. Information concerning these allotments is presented in Table 9.

Range improvement projects in the WSA are limited to short-gap fences, generally across the drainages from rim to rim. The areas above and below these fences serve as management units. The potential exists for land treatments (spraying, burning, or chaining and seeding) in wider canyon bottoms to remove overgrown sage, which would increase forage. Approximately 346 acres have been identified for burning and seeding. An additional 43 AUMs would result from this treatment.

Wild horses or burros are not known to inhabit the WSA.

Visual Resources

The Coal Canyon WSA has steep slopes that present 10- to 50-foot high sheer stone faces alternated with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give a striped appearance to the slopes that is noticeable some miles away. Towards the Roan Cliffs in the northern half of the WSA rock outcrops shade to reddish-brown, as the name implies. Landforms are more dissected in the Roan Cliffs, but are chiseled to sharp and intricate ridge lines.

TABLE 9
Livestock Grazing Use Data

Allotments	Cottonwood	Thompson Canyon	Bogart	Nash Wash	Cisco Sp. Wash	Cisco Mesa	Barley Flat
Class of Livestock	Cattle	Cattle	Cattle	Cattle	Cattle Sheep	Cattle	Cattle
No. of Operators	1	1	1	1	2	1	1
Season of Use	6/1-10/15	5/20-11/10	6/15-11/15	10/25-6/20	10/25-6/20 12/1-4/3	12/1-4/30	12/1-4/30
Total AUMs ¹	900	500	209	2,994	2,573	3,180	2,394
Total Acres ¹	33,920	13,120	12,965	39,680	45,600	63,100	40,320
Acres in WSA	15,915	1,240	12,965	6,674	4,300	7,400	12,936
Percent of Allotment in WSA	47	9	100	17	9	12	32
AUMs in WSA	423	45	209	507	231	381	766

Source: USDI, BLM, 1972.

¹These are totals for the allotment. The WSA incorporates only a portion of each of these allotments.

COAL CANYON WSA

A visual resource inventory classified the entire WSA as Class A scenery, which is scenery that contains the most outstanding visual characteristics of the physiographic region (Ray Mann Associates, Inc., 1977). The entire WSA is in the foreground/midground zone visible from boundary roads. The sensitivity level has been rated as high over about 26 percent of the WSA, medium over 36 percent, and low over the remaining 38 percent, reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors, the entire WSA falls within a VRM Class II management area. (An explanation of BLM's VRM system can be found in Appendix 7.)

Cultural Resources

No cultural inventory has been made of the area, and no cultural sites within the WSA have been documented. There is a prehistoric habitation site located adjacent to the WSA in the mouth of Cottonwood Canyon. Similar canyons near the WSA have documented sites and there is a high potential that Coal Canyon WSA also has cultural sites; however, the number and significance of these are currently unknown. No National Register sites, existing or proposed, are listed for the WSA.

Recreation

Recreational use of the WSA is low due to its remote nature and limited access. There is no evidence of hiking or camping use away from roads or ways. The total recreational use is estimated at approximately 500 visitor days annually. The primary use is for hunting. Due to the steep slopes and lack of roads within the WSA, hunters use four-wheel drive vehicles to drive up the road in the bottom of Cottonwood Canyon (this road separates Coal Canyon and Spruce Canyon WSAs) and hunt the hillsides on foot or by horseback. The Utah Division of Wildlife Resources (UDWR) has limited this area to four-point or better mule deer buck only hunting and is currently considering the area for a quality hunting unit.

Additional recreation opportunities in the WSA include hiking, cross-country skiing, horseback riding, backpacking, camping, sightseeing, and ORV use. The entire WSA is open to ORV use although the rugged terrain presents a natural barrier to ORV use. Currently, recreational ORV use (not related to hunting access) is essentially nonexistent on approximately 8 miles of ways due to the distance of the WSA from population centers and the presence of attractive ORV use areas more accessible from population centers. There

are no trails, campgrounds, or other recreational facilities within the WSA.

Wilderness Values

SIZE

At 61,430 acres, the WSA is of sufficient size to enhance wilderness values present. The WSA is approximately 12 miles north to south and 16 miles east to west.

NATURALNESS

Human imprints within the Coal Canyon WSA are noticeable in or near the central part of the WSA. For the most part, they are capable of being reclaimed to a relatively natural condition. These imprints consist of a dry hole, which has been plugged and abandoned, covering 5 acres; a shut-in drill hole (capable of production); covering 5 acres; a shut-in drill hole (capable of production); covering 5 acres at the end of a "cherry-stemmed" road; and two other dry holes, each covering 5 acres. In each case, the 5 acres include the cleared work area and drill pad. Access routes are associated with each drill site. About 8 miles of ways are within the WSA.

Grazing has occurred on ridges and in canyon bottoms, but not on the steep sideslopes. Mineral exploration (primarily oil and gas) has taken place in side canyons off Diamond and Cottonwood Canyons. The areas involved (either directly or indirectly) in grazing and mineral exploration total about 30,715 acres (50 percent of the WSA). The remainder of the WSA (30,715 acres or 50 percent) can be considered pristine. Considered as a whole, the WSA essentially meets the criteria for naturalness.

SOLITUDE

The large size and blocky configuration of the WSA contribute to a feeling of vastness, and the rugged topography and isolated nature provide outstanding opportunities for the visitor to find solitude.

The rugged topography provides screening sufficient to obscure sights and sounds of others within the WSA. The vertical separation between the ridge tops and canyon bottoms (up to 1,000 feet) enhances seclusion and feelings of isolation. This characteristic is more pronounced in the northwestern portion of the WSA.

The effectiveness of vegetation screening on steep slopes is diminished by the wide bands of rock outcrop. Vegetation in higher elevations (areas of Douglas fir forest) is more dense, enhancing screening possibilities. Areas of

COAL CANYON WSA

mountain shrubs provide dense thickets, but screening potential varies with overall vegetation height. Canyon bottoms vegetated with sage generally do not provide cover from lines of sight from slopes and ridge tops above.

Sights and sounds from outside the WSA would be confined to drilling along boundary roads, pipeline development, and use of equipment along the perimeter of the WSA; given the size and topography of the WSA, these would be insignificant within the unit as a whole.

Vistas from within the WSA have not been documented, but there is good potential that vistas toward the southeast, from Diamond Ridge, and other high points would be adequate to give a visitor the feeling of vastness.

The deeply incised, branching drainages within the WSA provide many travel routes that allow dispersion of recreational use.

In conclusion, it is believed that the entire WSA meets the requirements for outstanding opportunities for solitude, particularly because of the topographic screening.

PRIMITIVE AND UNCONFINED RECREATION

These opportunities are present uniformly throughout the WSA, but are not currently realized, as evidenced by lower visitor use figures.

Although the steepness and height of sideslopes may limit opportunities somewhat, the many drainages and the dissected terrain provide several potential hiking routes up canyon bottoms and along ridge tops. Opportunities for hiking and backpacking are considered outstanding throughout the WSA, as are opportunities for hunting.

It is concluded that the entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

SPECIAL FEATURES

The WSA has supplemental ecologic, scenic, wildlife, and potential archaeological values. The WSA covers part of an area of critical watershed and provides habitat for big game animals that shy away from areas of human occupation. Portions of the WSA are largely unexplored, and it is probable that scenic and archaeological features not mapped or named could be found by wilderness users.

Land Use Plans and Controls

Current land use of the Book Cliffs area is primarily oriented to oil and gas exploration activities,

wildlife, and livestock grazing. Ownership both within and adjacent to the WSA is predominantly BLM. There are five sections (3,116.36 acres) of State lands within the WSA; all are under mineral lease and all but one are developed. Several other State sections are along the WSA's border. Additionally, the WSA is contiguous for about 5 miles with a large block of State lands in the Roan Cliffs designated as a State roadless area that has not been open to leasing since 1975. The 48,491.94-acre State land area, northeast of the WSA, was described as "unique areas due to their isolation, wilderness qualities and other natural esthetics. The ever-present possibility of destructive erosion occurring on this fragile watershed has prompted the Board of State Lands . . . to declare [this area] as being roadless and no vehicles of any kind are to be allowed in this area" (Utah Department of Natural Resources, 1976). This declaration was subject to existing rights of mineral lease holders.

Private lands used for ranching adjoin the WSA on the southwest.

The adjacent and in-held State lands are very similar in character to lands within the WSA.

The BLM has developed a "Book Mountain Transportation Plan" (USDI, BLM, 1981b) which indicated engineering feasibility should access roads be proposed in the WSA. There are no existing rights-of-way within the WSA. There is an application for a right-of-way for a 4½-inch pipeline in Township, 19 South, Range, 21 East, Section 30. Oil field development of pre- and post-FLPMA leases could involve right-of-way applications for access roads or oil and gas pipelines. Normally rights-of-way are not required for on-lease development.

Access to the WSA currently is from I-70 by about 12 miles of graded dirt County roads (Cottonwood Canyon). It can be accessed directly from the Sego Canyon road (Thompson exit) and from the east Cisco exit. It can also be accessed from roads up Nash Wash, about 25 miles from the west Cisco exit. Roads below the Book Cliffs are maintained for oil field operations; above the cliffline they are sometimes impassable after wet weather or heavy snow.

The WSA is contiguous to three other BLM WSAs in Grand County. The four are very similar in terms of landforms, ecosystems, and development pressures.

The WSA is managed by the BLM Grand Resource Area under the Grand RMP. The Grand RMP has been reviewed by the Governor of Utah

and was found to be consistent with the plans of the State of Utah.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) recognizes mineral potential in the Book Cliffs area but does not make any specific management directives.

Socioeconomics

DEMOGRAPHICS

The WSA lies in north-central Grand County. The nearest communities are Thompson (population 200), about 10 miles southwest, and Cisco (population 45), about 15 miles southeast. Services are available in Thompson, but not in Cisco.

The closest major communities, or main gateways, to the WSA are Green River and Moab, Utah (66 and 67 road miles, respectively), and Grand Junction, Colorado (64 road miles).

Grand County can be characterized as rural and sparsely populated. The 1982 county population was 8,100, less than 1 percent of the State population of about 1.5 million (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The majority of the county is unpopulated with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab, and 32 percent lives in Spanish Valley which is adjacent to and southeast of Moab (USDC, Bureau of the Census, 1981). Grand County is fairly large, comprising about 3,615 square miles or 4.5 percent of the State of Utah. About 80 percent of the county is owned by the Federal government, 15.5 percent by the State, and 4.5 percent by private landowners.

Mesa County, Colorado, had a 1981 population of 87,100 (USDC, Bureau of the Census, 1981). Grand Valley, which lies in the midwestern part of the county, contains 83 percent of the county's population. Grand Junction (1980 population of 28,144) serves as a major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981).

EMPLOYMENT

Recent statistics show that 99 percent of local wage and salary employment in Grand County is nonfarm, with about 17 percent employed by Federal, State, and local governments (refer to Table 10). Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent mining and milling layoffs may reduce local mining importance. Tourism

TABLE 10
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agricultural	1	1
Mining	34	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10	8
Retail Trade	10	18
Finance, Insurance and Real Estate Services	3	2
Other	11	16
Total Private Industry	85	82
Federal Government	5	6
State and Local Government	9	10
Total Government	13	17
Total Nonagricultural	99	99
	(Dollars)	(Jobs)
Total Employment and Earnings	\$52,753	3,617
Total Personal Income	75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include wage, salary, and proprietors' income. Total employment figures include wage, salary, and proprietors' employment, whereas the employment percentage figures include only wage and salary employment. The relative importance of farm employment is, therefore, underrated.

directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money for export industries contributes to local income and employment. Including these multiplier effects, mining and tourism account for 35 to 45 percent and 17 to 25 percent of local employment, respectively. Unemployment in the county is among the highest in the State, with 1983 first quarter figures of almost 18 percent (Utah Department of Employment Security, 1983). This is primarily due to large mine layoffs and the resulting downturn through the local economy.

Green River (population of 1,048) is located in southeastern Emery County on the Grand County line. Green River is basically a tourism and farming community because of its location at the crossroads of U.S. Highway 6 and I-70. The mining and government sectors are also major employers in the area. Recent layoffs in the mining industry have resulted in significant unemployment, and some emigration from the area can be expected.

Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4-percent annual growth rate between 1970 and 1980. Despite the recent decrease in oil shale activities, the local economy in Mesa County still shows some signs of growth.

INCOME AND REVENUES

Activities in the WSA that could be of local economic consequences include mineral exploration and production, livestock production, and recreation related to hunting (refer to Table 11). Oil and gas activities within WSA boundaries have brought some income and employment to the area (less than 10 man years of employment in the past 10 years).

TABLE 11
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Oil and Gas Leases	None	Up to \$131,766
Livestock Grazing	Up to \$51,240	\$3,587
Recreational Use	Up to \$2,050	\$50
Total	Up to \$53,290	Up to \$135,403

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

The WSA has no mining claims. Eight livestock operators have grazing privileges in the WSA. Based on the average consumption of 2,562 AUMs of forage by cattle, it is estimated that the WSA accounts for \$51,240 of livestock sales, including \$12,810 of ranchers' returns to labor and investment.

Expenditures associated with deer hunting in the South Book Cliffs Deer Herd Unit contribute an estimated \$40,000 annually of wage salary and proprietors' income to the local economy. Some of this hunting takes place within the WSA. The WSA provides habitat for mule deer, and comprises about 10 percent of the acreage in Deer Herd Unit 28B. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Coal Canyon WSA is estimated at about 500 visitor days per year. Only

a portion of the expenditures for recreational use of the WSA contributes to the local economy.

The WSA generates revenues to the Federal Treasury from two sources: mineral leases and grazing fees. Within the WSA, 43,922 acres are currently leased for oil and gas. At \$3 per acre, this generates up to \$131,766 annually. Half of this, or up to \$65,883, is allocated back to the State of Utah. The state then reallocates these revenues to various funds, the majority of which are related to energy development. Based on the average 2,562 AUMs of forage consumed by livestock in the WSA (based on a \$1.40 per AUM grazing fee) the WSA can potentially account for \$3,587 of annual grazing fee revenues to the Treasury. One half of this is allocated back to the local BLM District for the construction of range improvement projects.

Over the past 3 years, two commercial outfitters have been permitted to run commercial hunting trips within the adjacent Flume Canyon WSA, with some incidental use of the Coal Canyon WSA. This has generated an average of about \$150 of revenue to the Federal Treasury each of the past 3 years. About two-thirds of this is attributed to the Flume Canyon WSA, with one-third (\$50 per year) attributed to the Coal Canyon WSA.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to

develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of the area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and other leasable and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but in some parts of the WSA it would probably be low due to the WSA's rough terrain and relatively limited resource potential; future development would be moderate to high in other parts of the WSA due to the known oil and gas (primarily gas) resources. Some major changes could occur in the area in terms of naturalness, wilderness values, and possibly wildlife protection. This would be due to the WSA's rough terrain and extensive imprints as a result of exploration and development. The proposed project to burn and reseed 346 acres for increased livestock forage would cause increased surface disturbance. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium, 20 acres; and coal, 690 acres. It is not anticipated that sufficient amounts of tar sand or oil shale exist in the WSA to justify any development considerations (refer to Affected Environment, Mineral and Energy Resources section for details). (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.)

AIR QUALITY

The WSA would continue to be managed as a PSD

Class II area. Disturbance of 870 acres by mineral activities would result in minor increases in fugitive dust emissions. The burning-and-seeding project on 346 acres would create temporary air pollution during the burning activity and increased potential for temporary dust conditions for a short time thereafter, until the seeding becomes established. Because no major sources of air pollutant emissions are proposed in the vicinity of the WSA, air quality would remain essentially as at present.

GEOLOGY

Minor impacts to geology are expected because surface disturbances associated with uranium, oil and gas, and coal exploration and development activities could possibly affect up to 870 acres. Geology would most likely be affected by subsidence associated with coal development.

SOILS

It is estimated that up to 870 acres of soil could be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.62 cubic yard/acre/year. If disturbed, the average rate of soil loss would increase to 6.7 cubic yards/acre/year, and the soil loss on the 870 acres would increase from 1,538 cubic yards/year to 5,829 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 4,291 cubic yards over current annual soil loss.

Soils would also be disturbed from rangeland developments. The 346 acres of burning-and-seeding activities would be designed to improve forage conditions, ground cover, and soil conditions. Ground cover would be disturbed during the early implementation stages, increasing erosion during the short term. BLM experience in the affected area indicates that the plant density existing before disturbance would be achieved or increased in about 4 years (USDI, BLM, 1982b).

VEGETATION

The anticipated disturbance of 870 acres due to mineral development (about 1.4 percent of the WSA) would not result in any major changes in vegetation types within the WSA. About 90 percent of the area consists of Douglas fir forest and pinyon-juniper woodland. Disturbance in the form of roads and drill pads could, however, alter the composition of the riparian-sagebrush community (4 percent of the WSA) if development occurred there. The burning-and-seeding project

for livestock would result in a planned vegetation change from sagebrush to grass species on 346 acres. No impacts to threatened or endangered plant species would occur since none exist in the Coal Canyon WSA.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect water quality. Surface disturbance from mineral and energy exploration and development could impact 870 acres under this alternative, with a soil loss increase of approximately 4,291 cubic yards per year. This would create a negative impact to the watershed, especially if surface disturbance were in the form of roads and drill pads on steep slopes. Watershed treatment in the Sagers and Cisco watersheds and in-stream drop structures for Horse and Cottonwood Canyons to improve water quality could be carried out under this alternative. These measures would reduce flood damage potential, sediment damage, and, in part of the Sagers and Cisco watersheds, reduce the contribution of salinity to the downstream Colorado River system.

Ground water resources in the WSA would not be significantly affected by implementation of the No Action Alternative, although potential coal mining activities could encounter ground water. This would have the possibility of altering ground water movement on a local basis.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas leasing categories in the WSA would remain as 1,400 acres in Category 1, and 60,030 acres in Category 2. The wilderness nonimpairment stipulations on 21,672 acres of post-FLPMA leases would be removed and 17,508 acres would be available for new leasing.

The WSA is considered to have relatively small, widely scattered oil and gas pools, anticipated to contain recoverable quantities of about 3 million barrels of oil (10 million barrels in-place) and 18 billion cubic feet of natural gas (60 billion cubic feet in-place). These oil and gas resources could be explored and developed without concern for wilderness values. The probability of development is considered low to moderate at this time, primarily due to steep terrain and economic factors; however, this could increase to high in the future for parts of the WSA.

Coal

The coal resource within the WSA has not been leased. Under this alternative, the area could be made available for lease, and exploration and development could occur. There is a high probability that moderate amounts of coal underlie the WSA (80 million tons in-place of which 38 million tons could be recovered) and that future leasing and development would occur.

Tar Sand and Oil Shale

No tar sand leasing has occurred in the WSA. A potential exists for less than 10 million barrels of in-place oil of which about 3 million barrels could be recovered. However, the WSA is not located in an STSA and tar sand development is not anticipated in the foreseeable future.

Presently no oil shale has been leased within the WSA. The potential exists for thin beds of oil shale that could yield less than 15 gallons per ton of shale. The WSA is estimated to contain less than 3 million barrels of recoverable oil shale. About 7,040 acres in the WSA are under an oil shale withdrawal.

Neither of these resources would be explored or developed until made available for lease. The potential for leasing and development is low due to the relatively small deposits predicted and the availability of larger and better defined tar sand and oil shale reserves elsewhere.

Locatable Minerals

Locatable mineral development could occur within the WSA. The WSA would remain open to mining claim location, with the exception of the 7,040 acres under oil shale withdrawal which would remain closed to mineral location until the withdrawal is revoked. The potential deposit of less than 500 tons of uranium oxide could be developed under this alternative; however, the probability of development is very low.

WILDLIFE

The WSA provides 60,630 acres of crucial winter range or year-round habitat for black bear, mountain lion, and elk. These species could be adversely affected in the short term by surface disturbance from mineral exploration and production. However, Category 2 oil and gas leasing stipulations would provide protection for these wildlife species and their range. It is assumed that similar stipulations would be developed for coal leasing when lands were made available for this type of lease.

There is a potential for 870 acres to be disturbed by mineral exploration and development. Species in the area could move out if habitat is disturbed and might or might not return after activities cease. Over the long term, forage for wildlife species could increase, based on reclamation and revegetation success. The entire Book Cliffs range in east-central Utah provides a similar type wildlife habitat, but habitat is limited in southeastern Utah to areas of higher elevation. Most of the east Book Cliffs area is now subject to some development pressure that, with additional development, could eventually have negative implications on bear, deer, mountain lion, and elk.

Habitat improvement projects to benefit wildlife could be developed, although none are planned. The potential vegetation treatment of 346 acres of burning and seeding for livestock could occur under this alternative; this would have some positive effects for wildlife. Wildlife transplants would be allowed without regard for wilderness values, although none are currently planned.

FOREST RESOURCES

Due to the limited accessibility and low production of the resource, significant harvest of forest products would not be expected within the WSA. About 870 acres of potential disturbance are expected from mineral exploration and development. The 346 acres of burning-and-seeding activities would occur in sagebrush areas and would not affect forest resources in the WSA. Because trees would not be harvested in either case, there would be no significant use or loss of forest resources with this alternative.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Grand RMP. The 2,562 AUMs currently allocated within seven allotments are assigned to eight livestock permittees. The potential exists for 870 acres to be disturbed by mineral exploration and development. This could have a temporary negative effect on vegetation and result in an undetermined loss of AUMs. However, these AUMs would be restored upon successful vegetation reclamation. Since there is little use of motorized vehicles to manage livestock, few, if any, changes in livestock management are expected. Short-gap fences could be maintained and future rangeland developments (such as the 346-acre burning project) could occur without concern for wilderness values.

VISUAL RESOURCES

With this alternative, visual quality in the WSA would be protected by limitations placed on

surface-disturbing activities and would be managed under VRM Class II objectives requiring that activities not be apparent. Even though mitigation measures would be applied, scenic values in areas affected by the estimated 870 acres of surface disturbance from mineral and energy exploration and development could be degraded and VRM Class II objectives would not be met in the disturbed areas. Measures would be taken to minimize visual contrast created by intrusions; however, even after rehabilitation, some permanent localized visual degradation would be expected. If roads, drill pads, and mines are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. Rangeland developments, including the 346-acre burning-and-seeding project, would also reduce visual quality in the affected areas until revegetation occurred, even though the projects would be designated to meet VRM objectives as much as possible.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is potential for 870 acres of surface disturbance by mineral exploration and development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Still, inadvertent loss or damage could occur in disturbed areas and the overall effect on cultural resources is unknown. There are no potential or existing National Register sites known to exist within the WSA, but inventory data currently are limited.

RECREATION

The entire 61,430 acres (including 8 miles of ways) would remain open to ORV use. Presently, ORV use (except on existing roads and ways) is nonexistent due to natural barriers presented by the extremely rough terrain. Other more desirable ORV areas are located closer to population centers.

Primitive recreation values would be foregone in those areas where potential surface disturbance activities would occur (870 acres). If mineral-related access routes are constructed throughout the area, primitive recreational opportunities would be lost in the area altogether. Roads created for energy and mineral exploration and development would improve access into the areas for nonprimitive recreation.

Recreational use of the area is low, with hunting being the primary activity (500 visitor days per year). The future increase in recreational use of

the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from 500 current visitor days per year to 745 visitor days at the end of 20 years.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would continue under the existing Grand RMP. Expected mineral and energy exploration and development could disturb an estimated 870 acres. Naturalness values now existing could be affected by this disturbance. Mineral-related actions (e.g., benching roads and drill pads on steep, rocky slopes) would cause permanent imprints. If roads and drill pads are located throughout the WSA, related surface disturbance could also result in a significant loss of naturalness and outstanding opportunities for solitude and primitive, unconfined recreation throughout the area.

Outstanding opportunities for solitude could also be adversely affected by the sights and sounds of mineral operations within the area while exploration and production were ongoing. In addition, the 346-acre burning-and-seeding project could also result in a loss of wilderness values. Hunting is the most popular activity and would be highly influenced by impacts to wildlife and their habitat. In areas of surface disturbance the opportunities associated with wilderness values would be foregone.

Special features of ecosystem variation, scenic qualities, cultural, and sensitive wildlife habitat could also be affected due to potential mineral-related surface disturbance.

LAND USE PLANS AND CONTROLS

Not designating wilderness would be consistent with the *Grand County Master Plan* goal of continued multiple use and maximizing mineral production. The WSA is currently managed under BLM's Grand RMP and nondesignation is, therefore, consistent with this Plan. The No Action Alternative would also be consistent with the State of Utah policy of emphasizing economic return from State school lands.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. Mineral resources would continue to be developed. Development could be beneficial to both local and regional economies because this alternative would allow for the full potential for mineral leases to be explored. However, development of tar sand and oil shale resources is considered unlikely. There would be no loss of leasable acreage. The existing lease fees (refer to Table 11) could continue and could be increased with additional leasing for oil and gas (\$52,524) and with future leases for coal. Half of these revenues would go to the State.

Grazing use would continue as authorized by the Grand RMP (2,562 AUMs). The proposed 346-acre burning-and-seeding project could be implemented and the additional 43 AUMs could increase Federal revenues by \$60 annually.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 245 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Development of mineral resources in the WSA could possibly reduce big game populations and hunter success. This would reduce the number of hunters and hunter-related expenditures by an unknown but small amount.

All Wilderness Alternative (61,430 Acres)

As discussed in the Description of the Alternatives section, the major changes that could occur in the 61,430-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). The 61,430 acres would also be closed to ORV use, except for approvals by BLM. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that existing oil and gas leases held by production and unit agreements would continue with production of

COAL CANYON WSA

commercial quantities resulting in a surface disturbance of 160 acres. Other oil and gas leases would not be renewed and future leasing of oil and gas, as well as any other mineral resource leases, would not be allowed. (Appendix 10 lists surface disturbance assumptions and estimates for minerals in the WSA.) It also is assumed that the 346-acre burning-and-seeding project would not be allowed.

Because areas potentially disturbed by mineral exploration and development would be smaller than under the No Action Alternative (160 vs. 870 acres), impacts on air quality, geology, vegetation, and forest resources would be insignificant for the All Wilderness Alternative, as described for the No Action Alternative. Wilderness protection would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

The soil resource would benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

It is estimated that up to 160 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.62 cubic yard/acre/year. If disturbed, soil loss would average 6.7 cubic yards/acre/year. Soil loss on the 160 acres would increase from 99 cubic yards/year to 1,072 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined. Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 973 cubic yards over current annual soil loss.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance occurred, increased sediment yield could affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 160 acres under this alternative. However, there would be no significant change from the current situation and water resources would not be affected. The planned in-stream drop structures in Horse and Cottonwood Canyons and watershed treatments in the Segó and Cisco watersheds likely would not be allowed unless designed to blend with the wilderness environment, constructed of natural materials, and placed by hand methods. Thus, the opportunity for flood, sediment, and salinity reduction as

noted in the No Action Alternative likely would be foregone. The ground water resource in the WSA would not be affected by implementation of the All Wilderness Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Wilderness designation would have an impact on exploration for oil and gas. Post-FLPMA leases (currently covering 21,672 acres of the WSA) would be subject to wilderness stipulations. These leases and possibly some pre-FLPMA leases likely would not be explored, developed, or reissued. In the areas not held by leases with prior existing rights, undiscovered oil and gas resources would not be explored or produced and an estimated 2 million barrels of oil and 12 billion cubic feet of natural gas considered recoverable could be foregone under this alternative. Some of the more favorable areas surrounding the WSA have been explored and developed and at least 19,000 acres within the WSA are held by production. Therefore, it is expected that these areas and possibly some additional pre-FLPMA leases would continue to be developed under prior existing rights. Terrain characteristics combined with current economic conditions have resulted in a relatively low level of oil and gas activity in and near the WSA at the present time. It is concluded that resource exploration and development within the WSA would be costly, but likely would occur in the future due to overall favorability for production in the immediate area. With the leases currently held by production, it is estimated that about 1 million barrels of oil and 6 billion cubic feet of natural gas could be recovered from the WSA. Recovery of gas is more likely than oil.

Tar Sand and Oil Shale

The potential for the occurrence of tar sand exists within the WSA, with less than 3 million barrels of recoverable oil. Also, the potential for recovery of oil shale in the Coal Canyon WSA is estimated at 3 million gallons of recoverable shale oil. The WSA has not been leased for either tar sand or oil shale and leasing could not occur with this alternative; however, the potential for recovery would be foregone. This is not considered a significant impact because the potential for recovery of these materials is low in the WSA, even without wilderness designation.

Coal

There is a high probability that moderate amounts of recoverable coal underlie the WSA. No leases for this resource exist and none would be issued

with this alternative. Thus, the potential for the development of 80 million tons of recoverable coal would be foregone. This would not be significant to the State or national coal production situation, but it could have significant local considerations, particularly related to socioeconomics.

Locatable Minerals

The area would be withdrawn from mining claim location. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. Since no valid mining claims occur within the WSA at this time and the potential for locatable minerals is low, it is assumed that no claims and no disturbance would occur. The worst-case impact to minerals would occur if the potentially recoverable minerals are not within mining claims filed prior to designation. In that case, the potential for recovery of up to 500 tons of uranium oxide would be foregone.

WILDLIFE

Wildlife would benefit from the reduction of potential surface-disturbing activities. Black bear, mountain lion, and elk throughout the WSA would benefit from preservation of solitude. Even with wilderness designation, some wildlife could be affected as a result of oil and gas activities on leases with prior existing rights.

Habitat for the black-footed ferret (endangered), any candidate species that may be in the WSA, and crucial habitats for elk, black bear, and mountain lion would receive additional protection from surface disturbance under this alternative. Prior to any mineral development, BLM would conduct site-specific clearances of potentially disturbed areas. If the endangered black-footed ferret or any of the candidate species possibly located in the area could be affected, BLM would initiate Section 7 consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these animals, it can be reasonably concluded that the viability of populations of any endangered animal species would be preserved under the All Wilderness Alternative.

Potential wildlife transplants would be allowed, although none are currently planned.

No wildlife management facilities have been proposed for the WSA. The potential vegetation treatment of 346 acres for livestock likely could

not occur under this alternative; therefore, incidental wildlife benefits would be foregone.

Although the potential for future habitat projects (such as rejuvenating climax vegetation) would be restricted with wilderness designation, the overall effects of designation would be positive due to the preservation of natural conditions and solitude in much of the WSA.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Grand RMP. The 2,562 AUMs currently allocated in the WSA would remain available for cattle forage. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected.

The rangeland improvements present (short-gap fences) would be maintained as in the past, based on practical necessity and reasonableness. Development of future roads or other rangeland improvements could be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources, but would be restricted to preserve wilderness values. The potential 346-acre vegetation burning-and-seeding project proposed for the WSA would not be allowed and the potential increase of 43 AUMs would be foregone. This would not have a significant affect on livestock production.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative, visual quality would be maintained through management under VRM Class I (which generally allows for only natural ecological change), through ORV closure, and through closure of the entire area to future new mineral leasing and location.

Under this alternative the disturbance from 346 acres of planned burning-and-seeding would not occur, but 160 acres of mineral-related disturbance would be associated with development of oil and gas leases held by production and other prior existing rights. This 160 acres of disturbance could be extended over parts of more than 19,000 acres of existing leases in the WSA. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized visual degradation could be expected.

As noted above, the lease areas cover a large acreage. If roads for development of the leases were constructed over considerable lengths in the steep terrain (worst-case analysis), VRM Class I objectives might not be met on large portions of the WSA. Because the potential for development of pre-FLPMA and other leases held by production may be high in the future, visual quality would be significantly reduced.

CULTURAL RESOURCES

Wilderness designation would benefit cultural resources by limiting surface-disturbing activities and restricting motorized access. There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities.

RECREATION

The entire 61,430 acres (including about 8 miles of ways) would be closed to ORV recreational use. Presently, this activity within the WSA is nonexistent, except as a means of access for hunters. This would not significantly affect hunter use in the WSA, as many of the hunters also use horses for additional access.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA likely following wilderness designation could lead to an estimated 6,143 visitor days, an increase of about 5,643 visitor days more than the current use and 5,398 more than projected for the No Action Alternative. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, and due to the size of the WSA, the quality of the primitive recreation experience probably would not be negatively affected by the increased use. The quality and the amount of primitive use could be reduced by the oil and gas activities on the existing leases on over 19,000 acres of the WSA. Commercial hunting outfitters could benefit from wilderness designation if these oil and gas activities do not substantially affect big game. As recreation use increased, commercial businesses based on hunting or primitive recreational activities could apply for use of the WSA.

WILDERNESS VALUES

Designation and management of all 61,430 acres as wilderness would assist the preservation of wilderness values. The WSA contains 61,430 acres of naturalness and outstanding opportunities for solitude and primitive, unconfined recreation values that would, in part, be protected. The special features in the WSA (i.e., ecologic, scenic, cultural, and wildlife) also would be protected and preserved, in part.

The potential exists for 160 acres of surface disturbance to occur due to mineral and energy exploration and development. Wilderness values within this acreage would be affected, especially if disturbance occurred in the form of roads.

There are more than 19,000 acres of oil and gas leases held by production where activities with prior existing rights within the Coal Canyon WSA could impair wilderness values. Existing development within the WSA (two shut-in wells capable of production) and surrounding the WSA (many producing wells) indicate that parts of the WSA could have substantial oil and gas activity in the future. Due to the area's rough terrain and the need for rather extensive impacts to even access the area, wilderness values would be foregone on 160 acres (directly affected) and up to about 19,000 acres (indirectly affected).

Primitive recreational use of the area would most likely increase with public awareness of the wilderness area, as noted in the preceding Recreation discussion. The WSA is adjacent to two other BLM WSAs and a State roadless area. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

LAND USE PLANS AND CONTROLS

The BLM Grand RMP does not provide for wilderness designation. Congressional designation of the WSA as wilderness would be an amendment to the RMP.

If State lands within the WSA are purchased or exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. Protecting critical watersheds and minimizing new road construction would be consistent with the adjacent State roadless area.

Designation generally would be consistent with the *Grand County Master Plan* because many resources would be allowed although under more

COAL CANYON WSA

restrictive conditions. Designation would not be consistent with Grand County's stated policy of mineral development.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation there could be losses in part of the local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could otherwise occur under the No Action Alternative. An estimated one-half (about \$66,000) of the existing Federal revenues from oil and gas leases would be lost as the leases expired and were not reissued. About \$52,524 in new lease fees for areas now unleased would be foregone.

The potential for mineral development in the WSA is rated low relative to the quantities predicted, but the probability of future development is high (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Certain existing oil and gas leases could be developed, but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future local economic conditions from what they would be with mineral development under the No Action Alternative. It is predicted that potential future mineral-related local income could be significantly reduced by wilderness designation.

In 1980 approximately 0.001 people per acre were employed in the exploration and production of oil and gas from the most productive region in Grand County. The worst-case implication is that 20 jobs would be foregone with designation. There are numerous existing leases in the vicinity that could still be developed with designation; therefore, the potential loss of local employment would probably be less.

Although some of the potential labor requirements would come from workers temporarily moving into the area, many workers would be hired from Green River and Moab, Utah and eastern Mesa County, Colorado. Many oil and gas field services would be provided by local businesses, and some of the wages earned by the oil and gas workers would circulate through the local economy. Exploration and development of an

area's oil and gas resources is the most labor-intensive phase of oil and gas production, but are of relatively short duration.

Designation would have an adverse impact on the development of other hydrocarbon resources. Future market conditions, cost of new technologies, and the WSA's potential for tar sand and oil shale are highly uncertain, as is the potential employment foregone with designation. The coal resource in the WSA is of unknown grades; coal employment opportunities might or might not be foregone with designation. The potential for future revenues and royalties from coal would be foregone.

Recreation expenditures from the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of this and the adjoining WSAs over the past 3 years. It is possible that additional outfitters would make use of the area if it were designated wilderness, both for hunting and other primitive recreational uses. Hunter pressure on the South Book Cliffs Deer Herd Unit and related local expenditures likely would remain unchanged.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use estimated at about 5,418 visitor days more than the No Action Alternative (refer to the Recreation section). Related local expenditures would be about \$22,214 (average of \$4.10 per visitor day statewide) and would only be significant to the two commercial outfitters now using the WSA and those that may begin to use the WSA.

Expenditures associated with recreation in the Coal Canyon WSA would be well distributed among businesses in Green River and Moab, Utah with some spillover into western Mesa County, Colorado. However, the resulting local expenditures would be regionally insignificant. Other than to recreation outfitters, recreation expenditures would also be locally insignificant to any single business in the affected area.

The WSA is geologically favorable for oil and gas.

Livestock use and ranchers' income would continue as at present with up to \$51,240 of livestock sales including up to \$12,810 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone along with any resulting increase in ranchers' income. One such improvement, a 346-acre burning-and-seeding project, has been proposed. If this project were to be denied potential local livestock sales of \$860 and an estimated annual \$60 of Federal grazing

COAL CANYON WSA

revenues from 43 additional AUMs would be foregone.

With designation, current livestock use could not increase. New rangeland improvements would be allowed only if primarily for the purposes of

resource protection and management. Wilderness designation would place greater restrictions on operations within the WSA; however, increased costs would not be significant.

BIBLIOGRAPHY

- Aerocomp, Inc. 1984. *Final Air Quality Analysis for the Combined Hydrocarbon Environmental Impact Statement, Eastern and South-Central Utah*. March 1984. Aerocomp Document 33TR01. Costa Mesa, California. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David T. 1985. "Soil Erosion Information" (unpublished document). January 1985. U.S. Department of the Interior, Bureau of Land Management, Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions in Utah" (unpublished document). Cambridge, Massachusetts.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of WSAs Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. October 1979. Salt Lake City, Utah.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." January 1982. Volume 4, No. 6. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1972. "Grand Resource Area

COAL CANYON WSA

- Unit Resource Analysis" (unpublished document). January 12, 1972. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U. S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981a. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981b. "Book Mountain Transportation Plan" (unpublished document). December 1981. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Proposed Management Plan, Final Environmental Impact Statement*. December 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (Map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Natural Resources. 1976. "State Roadless Area Adjacent to Coal Canyon Wilderness Study Area" (personal communication). July 30, 1976. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Prepared by the Transportation Planning Division in cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan, 1980 SCORP*. Salt Lake City, Utah. p. 157.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Forest Service, Northwestern Forest Service Experiment Station, Washington.

Spruce Canyon WSA



SPRUCE CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	2
DESCRIPTION OF THE ALTERNATIVES	3
Alternatives Considered and Eliminated from Detailed Study	3
Alternatives Analyzed	3
No Action Alternative (Proposed Action)	3
All Wilderness Alternative	5
Summary of Environmental Consequences	7
AFFECTED ENVIRONMENT	7
Air Quality	7
Geology	9
Soils	9
Vegetation	10
Water Resources	10
Mineral and Energy Resources	10
Wildlife	13
Forest Resources	14
Livestock and Wild Horses/Burros	14
Visual Resources	15
Cultural Resources	15
Recreation	15
Wilderness Values	15
Land Use Plans and Controls	16
Socioeconomics	17
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	19
Analysis Assumptions and Guidelines for All Alternatives	19
No Action Alternative (Proposed Action)	19
All Wilderness Alternative	23
BIBLIOGRAPHY	29

SPRUCE CANYON WSA

(UT-060-100C1)

INTRODUCTION

General Description of the Area

Spruce Canyon Wilderness Study Area (WSA) lies in the Book Cliffs region of north-central Grand County, Utah. It contains approximately 20,350 acres of public land administered by the BLM, Moab District, Grand Resource Area. Within WSA boundaries is one section of State land totaling 640 acres. The *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980) originally indicated the WSA's size as 20,650 acres. Acreage differences in this amended document are attributable to Master Title Plat checks. The WSA is crescent-shaped, roughly 9 miles east-west and 5 miles north-south at its widest point.

The WSA has a semiarid high desert climate. Average annual precipitation is 12 to 18 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F.

Spruce Canyon WSA is in the rugged terrain of the Book Cliffs and extends to the top of the Road Cliffs. It consists of a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading south to Cottonwood Canyon along the southern boundary of the WSA.

Vegetation within the WSA is predominantly Douglas fir forest, pinyon-juniper woodland, and a riparian-sagebrush community located in the canyon bottoms.

The WSA lies about 15 miles northwest of Interstate Highway 70 (I-70). The nearest towns are the small communities of Thompson and Cisco, Utah (about 15 miles southwest and southeast of the WSA, respectively) and Mack, Colorado (about 25 miles southeast). Spruce Canyon is one of several contiguous WSAs located along the south face of the Book Cliffs. The adjoining WSAs on either side of Spruce Canyon are Flume Canyon (UT-060-100B) and Coal Canyon (UT-060-100C2).

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the Grand Resource Area are discussed in Volume I. Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in analyses for individual WSAs. Fifteen specific issues pertaining to the Spruce Canyon WSA were identified through the

public scoping process (USDI, BLM, 1984) and are responded to below:

1. *Comment:* In the Site-Specific Analysis (SSA), the analysis of impacts to energy and critical resources failed to quantify or state how there would be adverse impacts when the economic feasibility of development (meeting the prudent-man test) is remote. The mere presence of pre-FLPMA (Federal Land Policy and Management Act) oil and gas leases is not sufficient cause to eliminate the WSA. The analysis should indicate the need and potential for minerals.

Response: Mineral potential of the WSA has been quantified and is discussed in terms of estimated in-place and recoverable resources. These estimates were made by Science Applications, Inc. (SAI, 1982). A determination of the likelihood of mineral development in the WSA is also discussed. The mere presence of pre-FLPMA oil and gas leases is not sufficient cause to eliminate the WSA from consideration as a wilderness area and is not analyzed as such in this document. The impact analysis for each alternative is discussed in terms of the amount of the mineral resource that could be developed and the amount foregone. The presence or absence of strategic minerals in the WSA is also noted.

2. *Comment:* The analysis should consider minerals and other resources available outside the WSA and the effect of lost lease royalties on local socioeconomics.

Response: The Affected Environment section of this document discusses resources existing within the WSA and, in some cases (e.g., minerals, wildlife, etc.), resources surrounding the WSA. The impact analysis focuses on those resources that would be influenced by each alternative and differences that could occur between alternatives. The potential loss of lease royalties is discussed under the Environmental Consequences, All Wilderness Alternative section.



SPRUCE CANYON WSA

3. *Comment:* Do questionable low-to-medium oil and gas potential (f2) and moderate coal tonnage outweigh wilderness values?

Response: The relative values of resources located in the WSA will be considered as part of the recommendation process.

4. *Comment:* What criteria and systematic analysis were used to evaluate the relative values of competing resources? These factors must be applied consistently in all the SSAs.

Response: Minerals in the WSA were evaluated by SAI (1982). BLM land use documents, technical reports, and discussions with professionals familiar with the other resources were all used to evaluate the relative values of these resources in the WSA. Refer to the Affected Environment section for details and references.

5. *Comment:* Would there actually be a problem of manageability with respect to pre-FLPMA oil and gas leases?

Response: Pre-FLPMA leases are governed by stipulations determined at the time of the lease issuance before wilderness studies were mandated. Therefore, development of these leases may result in impairment of wilderness values as a prior and existing right.

6. *Comment:* Cost-benefit analyses are needed to identify wilderness economic trade-offs.

Response: Economic effects of designation or nondesignation are discussed in detail in the Environmental Consequences section.

7. *Comment:* What local economic effects would wilderness designation create?

Response: Local economic impacts of wilderness designation are discussed in the Environmental Consequences, All Wilderness Alternative section. Economic impacts resulting from designation of Spruce Canyon WSA are not expected to be significant.

8. *Comment:* Would wilderness designation be consistent with State and local land use planning?

Response: Consistency with State and local land use plans is discussed under each alternative. Designation generally would be compatible with State land use plans (considering transfer of State land out of the WSA) and would not be consistent with the *Grand County Master Plan*.

9. *Comment:* Maps and charts in the SSA are poorly defined and difficult to interpret.

Response: The maps in this document have been reworked and are much more clear and easily interpreted.

10. *Comment:* The Draft SSA failed to quantify statements, but uses "numerous, high, low, lack of," etc.

Response: This document provides quantification, when available, to terms such as low temperature thermal waters (between 20 and 90 degrees Centigrade [C]), etc. For some resources, anticipated impact quantification is not possible, resulting in qualitative statements.

11. *Comment:* What assumptions were used for the SSA analysis? How was "No Action" incorporated into "No Wilderness?"

Response: In this document the No Action Alternative analyzes impacts that would result from projected actions occurring in the area if it were not designated wilderness. The No Action Alternative and No Wilderness Alternative are synonymous in this document. Where management intentions under each alternative have not been clearly identified, assumptions are made based on management projections. These descriptions and assumptions can be found in the Description of the Alternatives section.

12. *Comment:* Is it an analysis assumption in the SSA that Congressional designation could override specific management actions?

Response: Specific analysis assumptions are presented for all alternatives. (Refer to Environmental Consequences, Analysis Assumptions and Guidelines for All Alternatives section.) Congressional designation could override specific management actions projected under the All Wilderness Alternative and would override specific management actions projected under the other alternatives.

13. *Comment:* Worst-case analysis in the SSA was applied in a biased manner. Because only 0.1 visitor day per acre is predicted, any increase in popularity of the region is discounted.

Response: Visitor-use increases are discussed under the Recreation section. It is estimated that visitor use would increase 2 percent annually for the next 20 years even without wilderness designation. After wilder-

ness designation it is estimated that use could be as much as 2,035 visitor days per year. This is .1 visitor day per acre. This judgment is based on use densities on well known wilderness areas in the region, the WSA's site characteristics, the population distribution about the WSA, and the availability of similar sites.

14. *Comment:* The recreation opportunities discussion in the SSA do not use BLM's own Recreation Opportunity Spectrum (ROS). Descriptions are not experience oriented.

Response: The recreation opportunities discussion covers activities currently occurring within the WSA and other opportunities possible within the WSA. These descriptions are discussed in terms of primitive values and opportunities for recreationists to find solitude, recreation, and special features. For a more complete ROS discussion on experience-oriented recreation opportunities, refer to the technical reports and the Grand Resource Area Resource Management Plan (RMP) (USDI, BLM, 1983).

15. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by SAI (1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft Environmental Impact Statement (EIS).

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed. A partial alternative was not identified because the natural features and potential conflicts occur consistently throughout the WSA.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (20,350 acres). Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

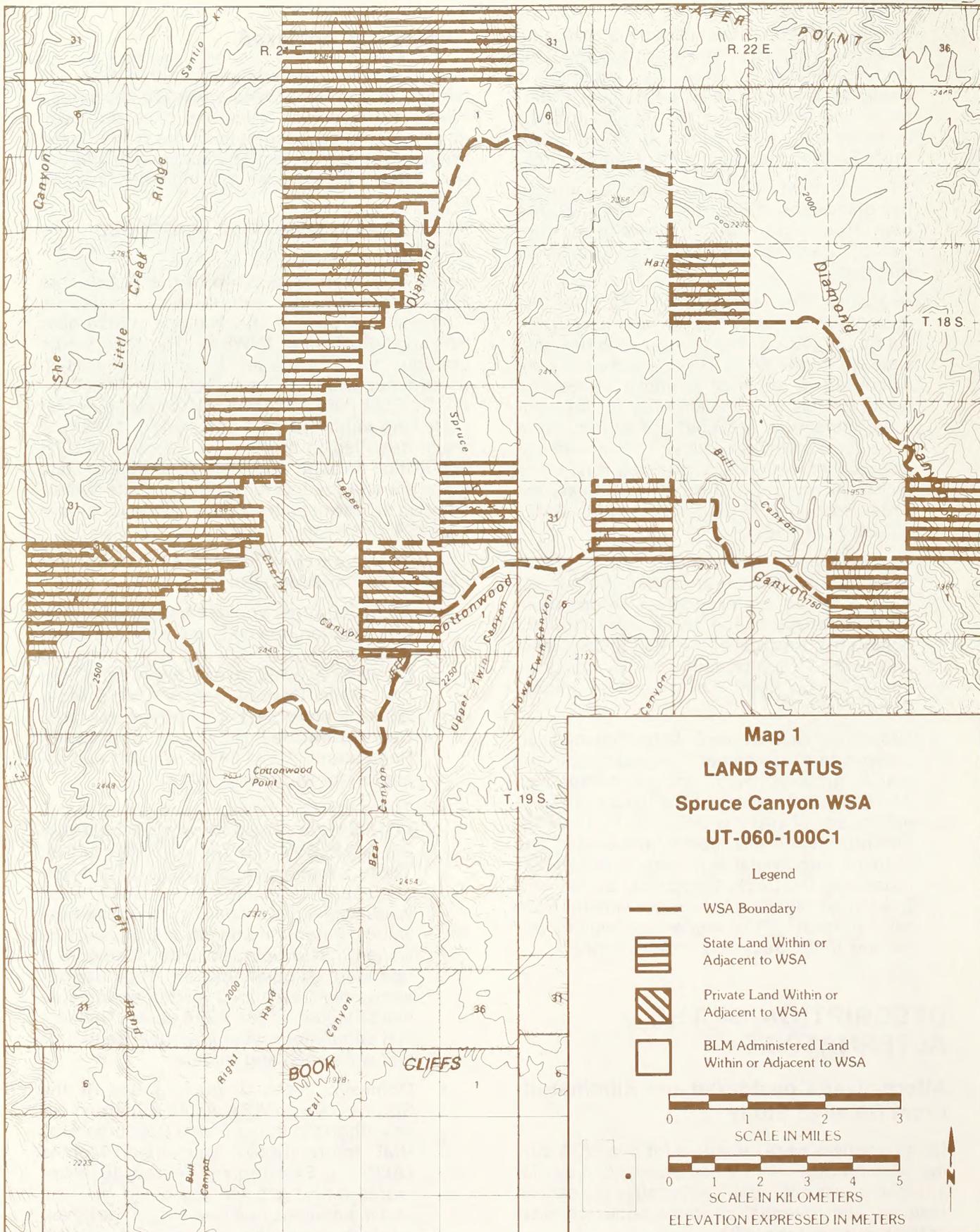
NO ACTION ALTERNATIVE (PROPOSED ACTION)

Under this alternative, none of the 20,350-acre Spruce Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed for multiple uses in accordance with the Grand Resource Area RMP (USDI, BLM, 1983). The one section (640 acres) of State land within the WSA (refer to Map 1) has not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining in State ownership. No private or split estate lands are located in the WSA.

The following are specific actions that would take place under this alternative:

- All 20,350 acres would remain open to mineral location, leasing, and sale. Development work, extraction, and patenting would be allowed on any future valid mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without consideration for wilderness values.
- There are 11 existing oil and gas leases in the WSA. Nine are producing. Nine leases are pre-FLPMA and two are post-FLPMA. These leases would continue to be developed per the stipulations imposed at lease issuance, without concern for wilderness values. Future oil and gas leases could be issued and developed under Category 1 (standard stipulations) on 11,580 acres, and under Category 2 (standard and special stipulations) on 8,770 acres. The special stipulations would restrict use to protect watershed and wildlife.
- Domestic livestock grazing use of the Spruce Canyon WSA would be carried out as authorized in the Grand Resource Area RMP (currently 552 Animal Unit Months [AUMs]). Existing rangeland developments (short-gap fences) could be used and maintained, and new rangeland developments could be implemented without

SPRUCE CANYON WSA



Map 1
LAND STATUS
Spruce Canyon WSA
UT-060-100C1

Legend

-  WSA Boundary
-  State Land Within or Adjacent to WSA
-  Private Land Within or Adjacent to WSA
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS



SPRUCE CANYON WSA

wilderness considerations. A 452-acre burning and seeding project and a 90-acre drill seeding project are planned. Special riparian management and season-of-use adjustments are also planned in the RMP.

- Development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the BLM planning documents. Watershed treatments are planned for Diamond and Cottonwood Creeks to improve water quality.
- The entire WSA acreage would continue to be open to off-road vehicle (ORV) use.
- The entire 20,350-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The area would continue to be managed under Visual Resource Management (VRM) Class II (17,900 acres) and Class III (2,450 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources. Except for the area just within the southern boundary where the prescribed burn is planned, the entire area would be managed under a limited fire suppression policy.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

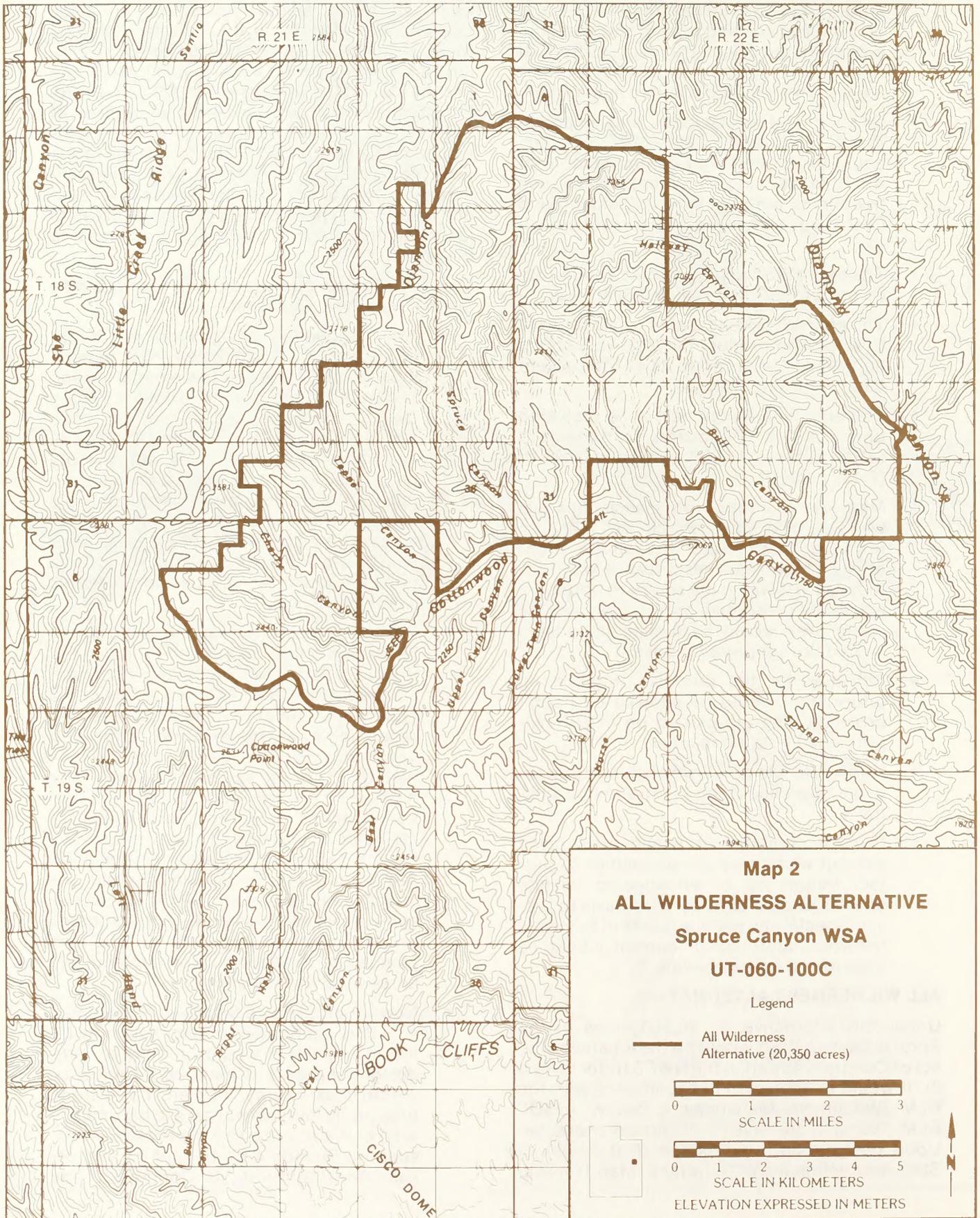
Under this alternative, all 20,350 acres of the Spruce Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character. Upon designation, one section (640 acres) of State land within the WSA (refer to Map 1) would

be transferred to Federal ownership by purchase or exchange. Additionally, the State has identified for exchange three sections (2,194 acres) of State land adjacent to the WSA that would logically be part of the WSA if in Federal (BLM) ownership. Other single State sections and a large block of State lands to the west of and adjacent to the WSA would not be exchanged. Refer to Volume I for a further discussion of State lands. The figures and acreages given under this alternative are for Federal lands only. There are no private or split estate lands located within or immediately adjacent to the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 20,350 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. There are no existing mining claims; therefore, no mining activities would be allowed. Existing post-FLPMA oil and gas leases involving 280 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. There are approximately 5,370 acres covered by pre-FLMPA leases, either held by production (4,810 acres) or within a unit (560 acres). No new oil and gas leases would be issued.
- Present domestic livestock grazing would be carried out as authorized in the Grand Resource Area RMP and related Allotment Management Plans. The 552 AUMs in the WSA would remain available to livestock. After designation, existing rangeland developments (short-gap fences) could be maintained in the same manner as in the past based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. The two planned seeding projects on a total of 542 acres would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the

SPRUCE CANYON WSA



SPRUCE CANYON WSA

U.S., 1964). The planned watershed treatments for Diamond and Cottonwood Creeks likely would not be allowed unless designed to blend with the wilderness environment and constructed of natural materials by hand methods.

- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA and none are specifically planned.
- The entire 20,350-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. One traveled way (jeep trail) about 1 mile in length would be closed. About 13 miles of road or jeep trails border the WSA, and these would remain open to vehicle use.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 20,350-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads or jeep trails that are adjacent to or dead-end at the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources in the WSA would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not

taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand or aerial techniques.

- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently under the alternatives are listed to present a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA is in a Prevention of Significant Deterioration (PSD) Class II air quality attainment area under the 1977 Clean Air Act Amendments and currently meets national air quality standards. The nearest Class I area is Arches National Park,

SPRUCE CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
SPRUCE CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (20,350 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 3 million barrels of oil from tar sand, 5 to 30 million tons of coal, and 500 tons of uranium oxide.	Oil, gas, tar sand, coal and uranium likely would not be recovered. Due to the low likelihood of recovery of these mineral resources, even without wilderness designation, the loss of development opportunity would not be significant.
Wildlife	Less than 1 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. Wildlife would benefit from land treatments.	Wildlife would benefit from solitude and preservation of naturalness.
Livestock	Grazing of 552 AUMs and maintenance of existing developments would continue. Proposed developments, consisting of 542 acres of land treatments, could occur.	Grazing of 552 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Proposed new developments would not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 722 acres.	Visual quality could be impaired on up to 40 acres.
Recreation	ORV use could continue on 1 mile of way. Overall recreational use could increase from the present 350 visitor days per year to 522 over the next 20 years. Up to 722 acres of mineral-related disturbance and land treatments could reduce the quality of primitive recreation.	The WSA, including 1 mile of way, would be closed to ORV use. Recreational use could increase to up to 2,035 visitor days due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 722 acres (3.5 percent of the WSA). If roads and drill pads are located throughout the WSA, wilderness values would be lost in the area as a whole.	Wilderness values would be protected, except on up to 40 acres (0.2 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Grand County Master Plan</i> , State of Utah plans and policies, and the current BLM Grand RMP.	This alternative would not be consistent with Grand County's concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM Grand RMP.
Socio-economics	Annual local sales of up to \$12,475 and Federal revenues of up to \$17,723 would continue. An additional \$44,100 per year in Federal revenues from leasing of presently unleased areas and \$97 from increased grazing and \$1,360 in local sales from increased grazing resulting from land treatments could be derived.	Annual local sales of up to \$12,475 and Federal revenues of up to \$16,883 would continue, but Federal revenues of up to \$44,940 from mineral leasing and \$95 from increased grazing and local sales of \$1,360 from increases in AUMs due to land treatments would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

SPRUCE CANYON WSA

about 30 miles south of the WSA. Canyonlands National Park, another Class I area, lies about 60 miles southwest of the WSA. Potential pollution sources include industrial and vehicular emissions from Castle Valley and the Green River area. Point sources in the vicinity include powerplants in Castle Valley and coal, oil, gas, and uranium exploration, production, and processing activities. Fugitive dust is the most significant air pollutant to the WSA and is intermittent depending on localized activities and winds. Air quality is good and visibility from ridgetops in the WSA ranges from 30 to 100 miles.

Geology

The WSA is in the Uinta Basin Section of the Colorado Plateau Physiographic Province. It lies entirely in the rugged terrain between the south-facing face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading north to Diamond Canyon along the northern boundary of the WSA, or south to Cottonwood Canyon along the southern boundary. Elevations range from 8,500 feet along Diamond Ridge in the northwestern part of the WSA to 5,500 feet in Cottonwood Canyon in the southeastern tip of the WSA.

The WSA is underlain by sedimentary rocks of Triassic, Jurassic, Cretaceous, and Tertiary Age. At the base of the tract along its southeastern side, the Mancos Shale and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River Formations. In the northwestern part of the WSA, the oil shale rich Parachute Creek Member of the Green River Formation crops out in an irregular band (specifically, the Mahogany oil shale bed). All strata in the vicinity of the WSA dip gently northward into the Uinta Basin.

The WSA is underlain by several sandstone units which are hydrocarbon producers in the vicinity, notably the Dakota, Cedar Mountain, Entrada, and Navajo Formations. The Morrison and Chinle Formations, known as major uranium producers in other areas of southeastern Utah, are also present, but indications are that the ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation.

Differential erosion of the layers of sandstones and shales has created the distinctive banded

appearance characteristic of the Book Cliffs. In the higher elevations toward the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. The landforms and geologic features of the WSA are typical of those found in the Book Cliffs as a whole. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, and arches.

Soils

Spruce Canyon WSA is characterized by steep canyons. About 45 percent of the area is composed of moderately deep and deep loamy soils on steep mountainsides. About 25 percent of the area is composed of shallow and deep stony soils on steep canyonsides. About 20 percent is very deep loamy soils on gently sloping alluvial fans along the canyon floors. The remaining 10 percent is rock outcrop occurring as cliffs and ledges. Refer to Table 2 for soil characteristics and land types.

Erosion throughout the WSA is a potential concern because of steep slopes and a tendency toward flashflooding. Erosion is generally natural in origin, from both wind and water. Sheet erosion (runoff) estimates for flat areas range from 0.1 cubic yard/acre/year to as high as 1.0 cubic yard/acre/year on steep sideslopes. Refer to Table 3 for erosion condition estimates.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock outcrop	10	2,0350	0	0
Moderately deep and deep loamy soils on steep mountainsides	45	9,158	1	20
Shallow and deep stony soils on steep canyon sides	25	5,087	1	10
Very deep loamy soils on gently sloping alluvial fans	20	4,070	0.1	1
Totals	100	20,350		

Source: Hansen, 1985.

SPRUCE CANYON WSA

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss If Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20	—	—	—	45	9,158	183,160
High	10	—	—	—	25	5,087	50,870
Medium	5	—	—	—	—	—	—
Low	1	70	14,245	14,245	20	4,070	4,070
Very Low	0.1	20	4,070	407	—	—	—
None	0	10	2,035	—	10	2,035	—
Totals		100	20,350	14,652 ¹	100	20,350	238,100 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.72 under present conditions; 11.70 if disturbed.

Vegetation

Existing vegetation is predominantly Douglas fir forest and pinyon-juniper woodland of varying density. The pinyon-juniper woodland also consists of high desert plant communities found along the lower elevations in the southeastern portion of the WSA. The Douglas fir vegetation type also consists of mountain shrub communities found along ridgelines toward the Roan Cliffs, especially on north-facing slopes. A riparian-sagebrush vegetation type occurs in the canyon bottoms. Scattered stands of ponderosa pine, aspen, cottonwood, and box elder are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs but not in sufficient amounts to be classified as separate vegetation types (refer to Table 4 for existing vegetation types).

Vegetation communities are localized depending on elevation, availability of water, and slope aspect. There are no known threatened, endangered, or sensitive flora species within the WSA.

The Spruce Canyon WSA lies in the Colorado Plateau Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type of the WSA is juniper-pinyon woodland. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir forest	9,550	47
Pinyon-juniper woodland	9,400	46
Riparian-sagebrush	1,400	7
Total	20,350	100

Source: USDI, BLM, 1972.

Water Resources

The major drainages in this WSA are Cottonwood, Diamond, Cherry, Tepee, Spruce, and Bull Canyons. Diamond Creek, along the northern boundary of the WSA, is a perennial stream from Oak Springs, flowing for approximately 7 miles within and along the WSA. Cottonwood Creek along the southern boundary is also perennial in part and flows for about 8 miles within and along the WSA. The other streams are intermittent. Two of the major drainages for the Spruce Canyon WSA, Diamond and Cottonwood Creeks, have been identified as areas damaged by floods and contributing to sediment damage. They have been identified as having potential for watershed treatments in order to minimize downstream damage. Adjacent areas contributing sediment and runoff would also be considered for treatment as determined after a more detailed investigation.

There are no known developed springs or wells in the WSA; however, a water inventory has not been completed. Geologic conditions are favorable for springs and seeps. Water quality point source data are lacking for the existing water resources within the WSA, but such data have been obtained from two point sources downstream from the WSA, each on perennial streams that make up the WSA boundaries.

Since the highly saline Mancos Shale is exposed only in the lower reaches of the WSA, surface water quality should, for the most part, be acceptable for recreation, wildlife, livestock, and agricultural uses. The extent or quality of the ground water resource in the WSA is not well known although the presence of springs indicates aquifers are in the area.

Mineral and Energy Resources

The BLM, in cooperation with the U.S. Department of Energy, had each WSA within Utah

SPRUCE CANYON WSA

assessed for its energy and mineral resources by SAI (1982) (refer to Table 5). Refer to Appendix 5 for a detailed description of the SAI rating system.

The potential for mineral resources in the WSA is low due to an unfavorable geologic environment. An overall importance rating (OIR) of 2= was assigned to the Spruce Canyon WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. Shades of importance are indicated by = or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA. The OIR of 2= applies to 100 percent of the tract evaluated by SAI which includes the 20,350-acre WSA. The WSA represents 24 percent of the evaluated tract (85,240 acres).

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

TABLE 5
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c3	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f2	c2	Less than 10 million barrels
Oil Shale	f2	c4	Less than 15 gallons per ton of shale
Uranium/Vanadium	f2	c2	Less than 500 tons
Coal	f3	c4	Moderate tonnage
Geothermal	f1	c3	None
Hydropower	f1	c4	None
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of vanadium that is currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

The SAI rating of f2 for oil and gas indicates that the potential exists within the WSA for small, widely scattered oil and gas pools, anticipated to contain less than 10 million barrels of oil in-place (3 million barrels would be considered recoverable) and less than 60 billion cubic feet of gas in-place (18 billion cubic feet would be considered recoverable); however, the SAI report also states that favorability is difficult to judge. SAI believes that future undiscovered potential is in small, relatively shallow fields. The certainty level of c3 indicates a reasonable assumption that oil and gas resources are present, based on the positive drilling data of nearby holes and the numerous nearby fields.

The WSA is along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production and potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields producing from the Jurassic, Entrada, and Morrison Formations, and the Cretaceous, Cedar Mountain, and Dakota Formations. Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA.

Approximately 26 holes have been drilled for oil and gas exploration within 3 miles of the WSA. Of these, three located on the boundary of the WSA are gas producers, and one about 3 miles to the southwest is an oil producer. These producing holes account for the presence of a known geologic structure (KGS) within the WSA.

The interior of the WSA has not been drilled, but it is believed that other small fields would be located in this area. (The small size of the potential fields that accounts for the SAI low favorability rating.)

SPRUCE CANYON WSA

Leasing and drilling activity has been high. Some of the fields near the WSA include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields are located northeast of the WSA. San Arroyo, the largest, has produced about 60 billion cubic feet of gas through 1974 since its discovery in 1962. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 billion cubic feet of gas). Small structural traps are responsible for their production.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

The WSA contains portions of 11 oil and gas leases covering about 5,650 acres. At least nine are producing leases. The remainder of the WSA, about 14,700 acres (73 percent), is unleased. About 560 acres (1 percent) of the WSA are unitized. Approximately 5,370 acres (26 percent) of the WSA are covered by nine pre-FLPMA leases and two post-FLPMA leases cover 280 acres (1 percent).

The WSA was included in the Moab District Oil and Gas Environmental Analysis Report (USDI, BLM, 1975), which established oil and gas leasing categories to protect certain resource values. These categories have been modified by the Grand Resource Area RMP. The leasing catego-

ries are now open (11,580 acres) and open with special stipulations (8,770 acres) restricting winter use to protect critical watershed and important deer and elk habitat.

A portion of one KGS is located in the WSA (5,548 acres within the WSA). The WSA also contains a part of one oil and gas unit agreement (560 acres within the WSA). Unit agreements typically pool several oil and gas leases together into a unit. Such an agreement makes work completed on any one lease within the unit area apply to all leases. This has implications in the drilling required to extend leases. A well drilled outside a WSA within a unit that straddled the boundary would, therefore, convey lease extension rights to all leases within the unit, including those within the WSA.

Oil Shale and Tar Sand

The WSA has limited potential for both oil shale and tar sand. An oil shale withdrawal covers approximately 16,000 acres (78.6 percent) of the WSA. This type of withdrawal, dating to 1930, was made to withdraw oil shale deposits both from oil and gas leases and from mining claim location under the mining laws. The SAI rating for oil shale is f2, based on the appearance of a small part of the Mahogany Zone of the Parachute Creek Member. This rating indicates a potential for thin beds of oil shale with a yield of less than 15 gallons of petroleum per ton of shale. The Mahogany has been under development for petroleum production in the Grand Junction, Colorado area, but extraction appears economically infeasible for the foreseeable future. The oil shale beds in the vicinity of the WSA are relatively thin and low grade.

The same Parachute Creek Member could have some potential for tar sand and is part of the reservoir rock in the P. R. Spring Special Tar Sand Area (STSA) located about 2 miles north of the WSA. Tar sand leases cannot be issued outside of STSAs. The SAI rating of f2 indicates that the potential would be much less than 10 million barrels of oil in-place. Extraction appears infeasible for the foreseeable future.

Coal and Potash

Other leasable resources produced locally are coal and potash. The WSA has no potential for potash, as it falls far north of the Paradox Basin where potash-bearing salts were deposited.

The SAI rating of f3 for coal indicates that a moderate tonnage of coal exists within the tract evaluated, which includes the WSA. The c4 certainty level is assigned based on the hundreds of coal

SPRUCE CANYON WSA

sections measured in and around the tract. The highest potential for coal is within the western end of the adjacent Coal Canyon WSA (UT-060-100C2), about 3 to 4 miles southwest of the WSA. The Spruce Canyon WSA is higher in the geologic section, northwest of the Coal Canyon coal outcrops. Between 10 and 60 million tons of in-place coal could be located in the WSA.

The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary Formations. The WSA is underlain by these strata, with coal bed outcrops in the southeastern border of the WSA. Most of the WSA lies within the Segoo Coal Field, which is about 65 miles long, 6 miles wide, and extends from the Green River to the Colorado/Utah State line. The Segoo Field comprises only a small part of the demonstrated coal reserve base of Utah, with recoverable reserves of 293.6 million short tons of coal in beds 4 feet or more thick. The Segoo Field was mined from 1912 to the early 1950s, but not within the WSA. A 3,925-acre coal withdrawal is shown on some plats, but was revoked in 1982. There are no coal leases in the WSA.

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees C). It seems very unlikely, however, that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA.

LOCATABLE MINERALS

The WSA has been rated by SAI as having a low potential (f2) for uranium/vanadium and negligible potential for other hardrock minerals. As of April 1983, no mining claims existed in the WSA. The 16,000 acres in the WSA which are covered by the oil shale withdrawal are closed to mineral location.

Uranium and Associated Minerals

The uranium/vanadium potential would be less than 500 tons of uranium oxide in a geologic environment only marginally favorable for the resource to occur. The certainty level is c2, indicating that limited positive data exist within the vicinity.

The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison Formation. This formation dips

north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, another major uranium-producing zone regionally, lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. The Wasatch Formation contains small anomalous uranium deposits. Because the Wasatch Formation is present within the WSA, it may have marginal potential for uranium/vanadium.

Although some prospecting for placer gold deposits has occurred within the Book Cliffs, there is no evidence of this type of activity within the WSA.

SALABLE MINERALS

The only possible salable minerals in the WSA are building stone and sand and gravel. Potential markets are very small and there are available sources of supply closer than those found in this WSA. No interest has been expressed in the development of salable minerals in the WSA and none is anticipated in the future.

Wildlife

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, cougar, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food, thermal cover, escape cover, and birthing areas. There are no areas of critical habitat. The black-footed ferret (which is endangered), the ferruginous hawk, long-billed curlew, Southern spotted owl, Western yellow-billed cuckoo (all of which are candidate species for possible threatened or endangered status), and the golden eagle (which is a BLM sensitive species), may be found in the WSA.

The WSA supports moderate to high populations of big game species. The most common is mule deer. A small number of deer can be found in the area yearlong. Most of the deer stay along the lower portions of the riparian drainages in the WSA. Approximately 170 to 200 deer (256 AUMs) inhabit the area during the spring through fall seasons, moving to lower elevations in the winter. The WSA is within Deer Herd Management Unit 28-B, and comprises about 3 percent of the acreage within that unit.

Elk can be found yearlong in the WSA. An additional 80 head (211 AUMs) of elk migrate into the area in the winter. Black bear and cougar can also be found yearlong, but are not abundant.

SPRUCE CANYON WSA

Upland game species include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffed grouse, and cottontail rabbit. Mourning dove are common in the WSA during the spring through fall seasons and may nest in pinyon-juniper trees. Grouse are present in this WSA yearlong. Blue grouse can be found at the higher elevations in the Douglas fir and aspen vegetation communities and ruffed grouse can be found along riparian drainages. Sage grouse are found in sagebrush parks at higher elevations. Cottontail rabbits are found unitwide.

The lower portions of Cottonwood and Diamond Creeks, which border the WSA, are perennial streams that have potential for supporting a population of trout. Several species of nongame fish (dace, shiners, suckers, and killifish) are present. No game fish presently inhabit these streams.

Several species of reptiles and amphibians are present. The most common are horned lizard, Great Basin sagebrush lizard, northern tree lizard, sideblotched lizard, whiptail lizard, gopher snake, smooth green snake, striped whipsnake, and midget faded rattlesnake. Several species of amphibians such as the red-spotted toad, Rocky Mountain toad, Great Basin spade foot toad, canyon tree frog, and Utah tiger salamander could be present along the Diamond Creek drainage.

The most common birds in the WSA are the red-tailed hawk, golden eagle, kestrel, great horned owl, goshawk, Cooper's hawk, sharp-shinned hawk, bluebird, blue jay, pinyon jay, sparrows, juncos, swifts, swallows, chickadees, kingbirds, kinglets, nuthatches, and magpie.

The WSA is favorable to wildlife because of its lack of human intrusion. Three species present are very sensitive to human intrusion: black bear, mountain lion, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species. Habitat for these species is found over the entire Book Cliffs area, including this WSA.

There are no existing or proposed wildlife management facilities or proposed wildlife transplants in the WSA nor are there Habitat Management Plans.

Forest Resources

No forest production is known to have taken place within the WSA. Even though timber species are present, the area is considered noncommercial and nonproductive because of inaccessibility,

rugged terrain, and slow growth of trees (50 to 75 years to produce 1-inch trunk development of Douglas fir); also, distance to mill is not favorable. Pinyon-juniper woodland in the area is generally incapable of yielding 20 cubic feet of commercial wood per acre per year. The area may have been used to provide firewood or posts, and could possibly yield Christmas trees for local use. There are 18,950 acres of pinyon-juniper and Douglas fir trees that could supply firewood.

Livestock and Wild Horses/Burros

The Spruce Canyon WSA contains portions of three grazing allotments that support 552 AUMs. Refer to Table 6 for livestock grazing use data.

Range improvement projects of record within the WSA are limited to short-gap fences, generally rim to rim across narrow drainages. The areas above and below these fences thus serve as management units. The potential exists for land treatments (spraying, burning, or chaining and seeding) in wider canyon bottoms to remove overgrown sage, which would increase forage.

The Grand Resource Area RMP proposes burning and seeding 452 acres and drill seeding another 90 acres, resulting in an increase of 57 and 11 AUMs, respectively.

TABLE 6
Livestock Grazing Use Data

	Grazing Allotments			Total
	Diamond ¹	Cottonwood ¹	Cisco Mesa ²	
Class of Livestock	Cattle	Cattle	Sheep	
Number of Operators	1	1	1	3
Season of Use	5/10-11/10	6/1-10/15	12/1-4/30	
Total AUMs ³	588	900	3,180	4,668
WSA AUMs	188	360	4	552
Percent of AUMs in WSA	32	40	Less than 1	
Total Acres ³	21,064	35,136	60,620	116,820
Acres in WSA	6,500	13,650	200	23,350
Percent of Allotment in WSA	31	39	Less than 1	

Source: USDI, BLM, 1972.

¹Since range survey data are not available to determine AUMs within the WSA, the AUMs shown for the Diamond and Cottonwood Allotments were derived by multiplying the percentage of the allotment within the WSA by the total AUMs within the allotment. This is approximate because all the acreage in these allotments is of the same vegetation types.

²For the Cisco Mesa Allotment, AUMs were estimated, based on the types of vegetation within the WSA. Most of the remainder of the allotment has a higher carrying capacity.

³These are totals for the allotment. The WSA incorporates only a small portion of each of these allotments.

SPRUCE CANYON WSA

Short segments of Cottonwood and Diamond Creeks, bordering the WSA, were identified for special grazing management of the riparian areas. A strip along Diamond Canyon, including about 1,300 acres along the northern border of the WSA, has been identified for potential change in season-of-use.

No wild horses or burros are known to exist within the WSA.

Visual Resources

The WSA presents a landscape typical of the Book Cliffs. The steep slopes present sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark green vegetation give a striped appearance to the slopes that is noticeable some miles away. Toward the Roan Cliffs in the northern half of the WSA rock outcrops shade to a reddish-brown. Landforms are more dissected in the Roan Cliffs and are chiseled to sharp and intricate ridge lines.

The WSA is classified as having both Class A and Class B scenery (Ray Mann Associates, Inc., 1977). Class A, which is scenery containing the most outstanding characteristics of the physiographic region, covers about 15,500 acres (76 percent) of the WSA. Class B, which is scenery that combines some outstanding features with some fairly common to the physiographic region as a whole, covers about 4,850 acres (24 percent) of the WSA. About 4,850 acres (24 percent) of the WSA is in the foreground/midground zone visible from boundary roads. The sensitivity level has been rated as high over about 17,900 acres (88 percent) of the WSA and medium over the remaining 2,450 acres (12 percent), reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors the WSA falls within VRM Class II on 17,900 acres (88 percent) and VRM Class III on 2,450 (12 percent). (Refer to Appendix 7 for information on BLM's VRM system and definition of terms.)

Cultural Resources

No cultural inventory has been made of the area, but one prehistoric site (an Indian campsite) within the WSA has been documented. European influence in the region dates from Mexican traders and French fur trappers in the early 1800s. The trapper Antoine Robidoux left an inscription dated 1837 about 9 miles northeast of the WSA at

the mouth of Westwater Creek Canyon. No designated National Register sites exist in the WSA. It is estimated that as many as 20 cultural sites could exist in the WSA, with 10 having National Register potential. Known cultural resource sites include: overhangs and a cave with mano and slab metate; lithic fragments and drill; and a shepherd camp nearby to the south.

Recreation

Recreational use of the WSA is low due to its remote nature and limited access. Field work done for this WSA revealed only limited evidence of hiking or camping use away from boundary roads. The total recreational use is estimated to be approximately 350 visitor days annually and is attributed to hunting. Hunters use four-wheel drive vehicles to drive along the boundary roads in Cottonwood and Diamond Canyons and hunt the canyons and hillsides on foot or by horseback. Because of this, hunting in the WSA is considered a primitive use. The Utah Division of Wildlife Resources (UWDR) has limited this area to four-point or bigger mule deer buck only hunting and is currently considering the area as a quality deer hunting unit. Bull elk hunting by permit is also allowed in the WSA. The adjacent Flume Canyon WSA has some hunting use permitted through two commercial users. Some incidental use may be made of the Spruce Canyon WSA in conjunction with these permits, but actual use cannot be measured.

Possible recreation opportunities include hiking, backpacking, camping, sightseeing, horseback riding, hunting, and ORV use. Under the Grand Resource Area RMP, the entire WSA would be designated as open to ORV use under 43 CFR 8340. Currently, recreational ORV use is essentially nonexistent because of the WSA's distance from population centers and the presence of more attractive ORV use areas accessible from population centers. The rugged terrain presents a natural barrier to ORV use. There are no trails, campgrounds, or other recreational facilities within the WSA. There is 1 mile of way off Diamond Canyon that is used by hunters and livestock operators.

Wilderness Values

SIZE

At 20,350 acres, the WSA's size is sufficient to enhance wilderness values present. The WSA is crescent-shaped, roughly 9 miles east to west and 5 miles north to south at its widest point.

SPRUCE CANYON WSA

NATURALNESS

Human imprints are not substantially noticeable within the WSA as a whole and are capable of being reclaimed naturally. These include dry drill holes covering a total of 10 acres and a vehicular way that runs for about 1 mile in a side canyon off Diamond Canyon. There are no post-FLPMA imprints within the WSA.

Grazing has taken place on ridges and in canyon bottoms, but not on the steep sideslopes. Mineral exploration has taken place in side canyons off Diamond and Cottonwood Canyons. These areas total about 4,000 acres (20 percent of the WSA). The remainder of the WSA (16,350 acres or 80 percent) can be considered untouched. The entire WSA meets the criteria for naturalness.

SOLITUDE

The large size and blocky configuration of the WSA contribute to a feeling of vastness, and the WSA's rugged topography and isolated nature provide outstanding opportunities for the visitor to find solitude.

The rugged topography provides screening sufficient to obscure sights and sounds of other visitors within the WSA. The vertical separation between the ridge tops and canyon bottoms (up to 1,000 feet) enhances seclusion and feelings of isolation. The opportunities for solitude are more pronounced in the northwestern portion of the WSA.

The effectiveness of vegetation screening on steep slopes is diminished by the wide bands of rock outcrop. Vegetation in higher elevations (areas of Douglas fir forest) is more dense, enhancing screening possibilities. Areas of mountain shrubs provide dense thickets, but screening potential varies with overall height of vegetation. Canyon bottoms vegetated with sagebrush generally do not provide cover from lines of sight from slopes and ridgetops above.

Sights and sounds from outside the WSA would be confined to drilling along boundary roads, pipeline development, and use of equipment along the perimeter of the WSA; given the size and topography of the WSA, these would not be significant within the unit as a whole.

Vistas from within the WSA have not been documented, but there is good potential that vistas to the southeast from Diamond Ridge and other high points would be adequate to give a visitor the feeling of vastness.

The deeply incised, branching drainages within the WSA provide many travel routes that allow dispersion of recreational use.

In conclusion, it is believed that the entire WSA (20,350 acres) meets the requirements for outstanding opportunities for solitude, particularly because of the topographic screening.

PRIMITIVE AND UNCONFINED RECREATION

Primitive and unconfined recreation opportunities are present uniformly throughout the WSA, but are not currently realized, as evidenced by lower visitor use than is found in other comparable areas.

Although lack of water in the interior of the WSA and the steepness and height of sideslopes may limit opportunities somewhat, the many drainages and the dissected terrain provide several potential hiking routes up canyon bottoms and along ridge tops. Opportunities for hiking and backpacking are considered outstanding throughout the WSA, as are opportunities for hunting.

It is believed that the entire WSA meets the requirements for outstanding opportunities for primitive and unconfined recreation.

SPECIAL FEATURES

The WSA has supplemental ecological, wildlife, scenic, and potential archaeological values. The WSA is part of a critical watershed and provides habitat for wildlife that shy away from areas of human occupation. Rock formations and color contrasts provide scenic value. The WSA is largely unexplored; it is probable that many scenic and archaeological features not mapped or named could be found by wilderness users.

Land Use Plans and Controls

Current use of the Book Cliffs is mainly oil and gas exploration activities, hunting, and livestock grazing. Ownership, both within and adjacent to the WSA, is predominantly BLM. There is one section of State land within the WSA. Five additional State sections are adjacent to the WSA. Additionally the WSA is contiguous for about 6 miles with a large block of State land in the Roan Cliffs designated as a State roadless area that has not been open to leasing since 1975. The adjacent and in-held State lands are similar in character to lands within the WSA. There are no private or split estate lands within the WSA.

The State lands in the Book Cliffs are generally leased for oil, gas, hydrocarbons, and coal. The in-held State land has been leased in the past for oil, gas, hydrocarbons, and coal but the leases have expired. Given the perceived mineral potential for the area, it is possible that these lands

would be leased again. All State sections, in-held and adjacent, are leased for grazing, with leases due to expire in 1990 or 1991. The management philosophy for these State lands is to maximize economic returns for the State School Fund.

BLM developed a Book Mountain Transportation Plan (USDI, BLM, 1981b) that indicated engineering feasibility, should access roads be built. Engineering criteria on the steep terrain dictate that potential roads would have to wind through the entire central core of the WSA to provide access to pre-FLPMA leases and State in-holdings if development should occur. There are no existing or pending rights-of-way within the WSA; however, oil field development of pre- and post-FLPMA leases could involve right-of-way applications for access roads or oil and gas pipelines. Normally, rights-of-way are not required for on-lease development.

The WSA is contiguous with two other BLM WSAs, Flume Canyon (UT-060-100B) and Coal Canyon (UT-060-100C2). The three are similar in terms of landforms, ecosystems, and development pressures. The WSA is contiguous to a 48,492-acre area declared as a roadless area by the State of Utah on August 21, 1975. The lands, northeast of the WSA were described as ". . . . unique areas due to their isolation, wilderness qualities and other natural esthetics. The ever-present possibility of destructive erosion occurring on this fragile watershed has prompted the Board of State Lands . . . to declare [this area] as being roadless and no vehicles of any kind are to be allowed in this area" (Utah Department of Natural Resources, 1976). This declaration was subject to existing rights of mineral lease holders.

The WSA is managed as a multiple-use area under the BLM Grand Resource Area under the Grand RMP. The Grand RMP has been reviewed by the Governor of Utah and found to be consistent with the plans of the State of Utah.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) does not specifically address the Spruce Canyon WSA. While the plan recognizes the mineral potential in the Book Cliffs area, it does not make any specific management directives. In general, the plan would continue existing uses and maximize mineral development. Wilderness designation within the county is not favored.

Socioeconomics

DEMOGRAPHICS

Access to the WSA currently is from I-70 by means of graded dirt county roads (Cottonwood Canyon road). The WSA can be reached within 30 minutes to an hour from I-70. From the east Cisco exit it is about 20 miles via Diamond Canyon. Roads below the Book Cliffs are well maintained for oil field operations; above the cliffline they are sometimes impassable during wet weather or heavy snow.

The nearest communities are Thompson (population 200), about 15 air miles southwest, and Cisco (population 45), about 15 air miles southeast of the WSA. Thompson offers limited services. The main gateways to the WSA are Grand Junction, Colorado, which is about 52 miles east of the east Cisco exit on I-70; Green River, Utah about 54 miles west; and Moab, Utah, about 55 miles to the south of the WSA.

The WSA lies entirely within Grand County, Utah, which can be characterized as rural and sparsely populated. The 1982 county population was 8,100, less than 1 percent of the State population of about 1.5 million. The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab and 32 percent lives in Spanish Valley, adjacent to and southeast of Moab. Grand County is fairly large, comprising about 4.5 percent of the State or about 3,615 square miles. About 80 percent of the county is owned by the Federal Government, 15.5 percent by the State, and 4.5 percent by private landowners.

EMPLOYMENT

Recent statistics (refer to Table 7 for specific income and employment information for Grand County) show that 99 percent of local wage and salary employment is nonfarm, with about 82 percent employed in private industry and 17 percent employed in Federal, State, and local governments (Federal employees account for somewhat less than half of this). Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent uranium mining and milling layoffs may reduce mining's local importance. Tourism directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export

TABLE 7
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agricultural	1	1
Mining	33	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10 ¹	8
Retail Trade	10 ¹	18
Finance, Insurance and Real Estate	3	2
Services	11 ¹	16
Other	—	—
Total Private Industry	85	82
Federal Government	5	7
State and Local Government	9	10
Total Government	14	17
Total Nonagricultural	99	99
Unemployment (1st Quarter, 1983)		18
	(Dollars)	(Jobs)
Total Employment and Earnings	\$52,753	3,617
Total Personal Income	\$75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

¹Includes 12 percent employment from tourism.

Note: Because of rounding, numbers are not additive. Employment percentage figures include only wage and salary employment. The relative importance of farm equipment is, therefore, underrated. Tourism is included as part of Services, Retail Trade, and Other Services.

industries contributes to local income and employment. Including these multiplier effects, mining and tourism account for 40 to 50 percent and 17 to 25 percent of local employment, respectively. The unemployment rate in Grand County is among the highest in the State, with first quarter figures approaching 12 percent in 1982. This is due primarily to large mine layoffs, and the resulting downturn through the local economy.

Green River (population 1,048) is located in southeastern Emery County on the Grand County line. Green River is basically a tourism and farming community because of its location at the crossroads of U.S. Highway 6 and I-70. The mining and government sectors are also major employers in the area. Recent layoffs in the mining industry have resulted in significant unemployment; thus, some emigration from the area can be expected.

Mesa County, Colorado had a 1981 population of 87,100 (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Grand Valley, which lies in the midwestern part of the county, contains 83 percent of the county's population. Grand Junction (1980 population of 28,144) serves as a

major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981). The county's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4-percent annual growth rate between 1970 and 1980. Despite the recent decrease in oil shale activities, the local economy still shows some signs of growth.

INCOME AND REVENUES

In 1981, the nonagricultural industry sector in Grand County produced 99 percent or \$74.65 million of total labor and proprietors' income within the county. Within this total income, the private sector produced 85 percent of these earnings (mainly from mining, tourism, and related trade) and the government sector produced 14 percent. Agricultural labor and proprietors' income totaled \$754,040 or 1 percent of total personal earnings.

Two commercial outfitters use the adjacent Flume Canyon WSA for hunting with some associated incidental use of this WSA. Earnings from this use are not known but are probably significant to the individual operators involved.

Past activities in the WSA that could be of local economic consequence include oil and gas exploration and production, livestock, and recreation. Table 8 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

Oil and gas exploration in the WSA has accounted for an unknown but minor amount of local employment and income.

TABLE 8
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	None	None
Oil and Gas Leases and Production	None	Up to \$16,950
Livestock Grazing	\$11,040	\$773
Recreational Use	\$1,435	No commercial permits
Total	\$12,475	\$17,723

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

Three livestock operators have a total grazing privilege of 552 AUMs within the WSA. If all this forage were utilized, it would account for \$11,040 of livestock sales, including \$2,760 of ranchers' returns to labor and investment.

The WSA's nonmotorized recreational use is low and related local expenditures are low. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Spruce Canyon WSA is estimated as about 350 visitor days per year. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Carbon County.

The WSA generates Federal revenues from mineral leases and livestock sources (refer to Table 8).

Oil and gas leases in the WSA cover approximately 5,650 acres. At \$3 per acre, lease rental fees generate up to \$16,950 of Federal revenues annually. In addition, the Federal government has received revenues from royalties and bonus bids related to production and leasing in that portion of the KGS located in the WSA. Half of these monies are allocated to the State, which then re-allocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 552 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$772 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

The WSA has no mining claims. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.
6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil, gas, and coal exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but would probably be low due to the area's rough terrain and limited

SPRUCE CANYON WSA

resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; and coal, 20 acres. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.) Because oil shale and tar sand development is unlikely in the foreseeable future, no surface disturbance from activities associated with these resources is anticipated. Short-term surface disturbance from the 452-acre burning and seeding and the 90-acre drill and seeding project would also occur. The total disturbance in the WSA could, therefore, be up to 722 acres.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Mineral-related surface disturbance of up to 722 acres would result in only minor increases in fugitive dust emissions; therefore, air quality would likely remain as at present. The planned 452-acre burning and seeding and the 90-acre drill and seeding projects could result in short-term increases in fugitive dust emissions until vegetation becomes re-established. No major sources of air pollutant emissions are proposed in the vicinity of the WSA.

GEOLOGY

No impacts to the geology of the WSA would be expected because oil and gas exploration and development activities would probably not exceed 180 acres and would involve surface disturbances and widely spaced wells that would not change the geologic structure of the area. The 452-acre burning and seeding and the 90-acre drill seeding projects would also not affect the geology of the WSA.

SOILS

It is estimated that up to 180 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.72 cubic yard/acre/year. Soil loss on disturbed areas in the WSA is estimated at 11.7 cubic yards/acre/year. Therefore, soil loss on the 180 acres could increase from 130 cubic yards/year to 2,106 cubic yards/year. This high rate of potential soil loss would be attributed to the steep terrain on the majority of the WSA. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA resulting from mineral development would increase by approximately 1,976 cubic yards over current annual soil loss.

Short-term soil losses resulting from the 452-acre burning and seeding and the 90-acre drill seeding projects could occur until successful revegetation to grasses resulted in a decrease in soil loss.

VEGETATION

The anticipated maximum of 180 acres disturbed by mineral development would not have a significant effect on the vegetation resource within the WSA. About 93 percent of the area consists of Douglas fir forest and pinyon-juniper woodland. If surface disturbance were mainly roads and drill pads, the loss of some trees would occur on the 180 acres disturbed by mineral exploration and development. However, roads would generally be constructed in the canyon bottoms in the riparian-sagebrush community found in the Spruce Canyon WSA. The 1,400-acre riparian-sagebrush community comprises the remaining 7 percent of the WSA and is a valuable vegetation type. It is not expected, however, that this vegetation type would be significantly affected by oil, gas, or coal exploration and development. The 452-acre burning and seeding and the 90-acre drill seeding projects would substantially alter the vegetation composition of the affected areas. These projects are designed to convert pinyon-juniper woodland to grassland. This vegetation change would be long term especially if the areas were maintained and reseeded. However, on a WSA-wide basis the overall effect to vegetation would be small.

No known threatened, endangered, or sensitive plant species occur in the WSA.

WATER RESOURCES

Surface disturbance from mineral and energy exploration and development could impact 180 acres under this alternative, with a soil loss increase of approximately 1,976 cubic yards/acre/year. This disturbance could result in a short-term increase in sediment yield; however, overall water quality would not be significantly reduced. The 452-acre burning and seeding and the 90-acre drill seeding projects could also contribute to short-term sediment increases in streams. However, overall water quality would not be affected. Over time, these projects would actually enhance and allow for more control of the watershed in the WSA. If an underground coal mine is developed, geologic formations could be fractured, affecting ground water by aquifer bleeding. Springs, if located in the WSA, could dry up or experience reduced flows. Exploration and development of oil and gas by well drilling would probably not affect the ground water under the WSA.

SPRUCE CANYON WSA

The development of water improvement structures planned for Diamond and Cottonwood Creeks could occur under this alternative and would result in improved water quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same, 11,580 acres in Category 1 (standard stipulations) and 8,770 acres in Category 2 (standard and special stipulations). The wilderness stipulations on post-FLPMA leases (280 acres) would be lifted and 14,700 acres currently unleased would be available for leasing.

The WSA is considered to have relatively small, widely scattered oil and gas pools, anticipated to contain less than 10 million barrels of oil in-place (3 million barrels would be considered recoverable) and less than 60 billion cubic feet of natural gas in-place (18 billion cubic feet considered recoverable). These oil and gas resources could be explored and developed without concern for wilderness values. Because leases (5,650 acres) and a KGS are located in the WSA the potential exists for exploration and development of oil and gas.

Oil Shale and Tar Sand

Even though a tar sand resource is believed to exist in the WSA it has not been included in a STSA. Because there are richer and more easily accessible tar sand resources elsewhere, tar sand exploration and development would not be expected to occur under this alternative. The potential exists for less than 10 million barrels of oil in-place.

The northern portion of the WSA (16,000 acres) is covered by an oil shale withdrawal that was created in the 1930s. Presently no oil shale has been leased within the WSA. Substantially richer deposits that are more easily accessible are located elsewhere. Therefore, because the oil shale occurs in thin beds that would yield less than 15 gallons per ton of shale and because it is not economically producible in the foreseeable future, it is assumed that development would not take place under this alternative.

Coal

The coal resource within the WSA has not been studied for suitability and is not available for leasing; thus, no leases exist. Under this alternative, the area could be made available for leasing in the future, and exploration and development could occur. There is a high probability that moderate amounts of recoverable coal underlie the WSA.

Because coal has been mined from the Se-go Field in the past there is a possibility that coal could again be mined from this field within the WSA boundary and an underground mine developed. Implementation of the No Action Alternative would allow for coal development in the WSA.

Locatable Minerals

The WSA would remain open to mining claim location with the exception of 16,000 acres covered by the oil shale withdrawal, which would remain closed to mineral location. A potential deposit of less than 500 tons of uranium oxide is believed to be located in the WSA and could be developed. However, because there are richer and more accessible deposits located elsewhere, no claims are located in the WSA, a minimal quantity is present, and the environment is only marginally favorable for occurrence, development is unlikely to occur and is not assumed under this alternative.

WILDLIFE

The WSA provides habitat for species sensitive to human presence. These species would be adversely impacted by the anticipated 180 acres of surface disturbance from mineral exploration and development because a loss of habitat would occur. However, population viability would not be affected since no critical habitat would be lost. The animals could move into adjacent areas because the WSA encompasses only a small portion of the recognized habitats for these species. The existing oil and gas leasing categories would provide special stipulations to protect certain wildlife species and their habitat (e.g., elk winter range). It would be assumed that similar stipulations would be developed for coal leasing when lands were made available for this type of lease.

The planned 452 acres of burning and seeding and 90 acres of drill seeding could occur under this alternative and would improve forage for wildlife as well. Although none are planned, wildlife transplants could also occur.

Prior to surface-disturbing activities, BLM would initiate Section 7 consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect the endangered, candidate, and BLM sensitive species that may be in the WSA, it can be reasonably concluded that the visibility of their populations would be preserved under the No Action Alternative.

SPRUCE CANYON WSA

FOREST RESOURCES

An undetermined amount of fuelwood would be available for harvesting through fuelwood sales. However, no fuelwood harvest has occurred in the past, and none is presently occurring. Long travel distances on dirt roads and difficult terrain could discourage fuelwood harvesting in the vicinity of the WSA. Travel distances and road conditions also limit the cost effectiveness of harvesting the fuelwood. Therefore, implementation of the No Action Alternative would not result in a significant increase in woodland harvest or loss of forest resources in the WSA. The Douglas fir type in the WSA is considered noncommercial; therefore, no timber harvest would occur.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Grand Resource Area RMP. The 552 AUMs currently allocated within three allotments are controlled by three livestock permits. Since there is little use of motorized vehicles to manage livestock, few, if any, changes in management of livestock would occur. Short-gap fences could be maintained, additional roads built, although none are currently planned, and new rangeland developments (e.g., the 452-acre burning and seeding and 90-acre drill seeding projects) could occur without concern for wilderness values. The burning and seeding and drill seeding projects would ultimately result in an increase of 68 AUMs.

VISUAL RESOURCES

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 180 acres of surface disturbance from mineral and energy exploration and development and 452-acre burning and seeding and 90-acre drill and seeding projects would be degraded. Therefore, VRM Class II management objectives would probably not be met during the short term, but would probably be met in Class III areas. The majority of the WSA (17,900 acres) has been classified as VRM Class II. Even after rehabilitation, some permanent localized degradation would be expected. If roads, vehicular ways, and drill pads are located throughout the area for energy and mineral exploration and development (worst-case analysis), visual quality in the WSA would be significantly reduced. The probability of extensive energy and mineral exploration and development is low. VRM Class II management objectives would probably not be met on the 452-acre burning and seeding and 90-acre drill seeding projects. This intrusion would probably be visible

and exceed Class II management objectives until the treated areas returned to natural vegetation. The intrusion could be considered permanent if the manipulated area were regularly maintained. This intrusion would affect visual resources on about 2.6 percent of the WSA.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 180 acres of surface disturbance by mineral exploration and development, 452 acres of burning and seeding, and 90 acres of drill seeding under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in the disturbed area. There is one potential National Register site within the WSA.

RECREATION

The entire 20,350 acres would remain open to ORV use. Presently, ORV use does not occur in the WSA due to natural barriers presented by the extremely rough terrain and other more desirable ORV areas closer to population centers. The 1-mile vehicular way in Diamond Canyon would remain open to traffic although current use is low.

Primitive recreation values would be foregone in those areas where potential mineral-related surface-disturbing activities would occur (180 acres). If roads and drill pads are located throughout the area, primitive recreational opportunities would be lost in the area altogether. Recreational use of the area is low, with hunting being the most popular (350 visitor days per year). Roads created for energy and mineral exploration and development, however, would improve access into the areas for nonprimitive recreation use. The burning and seeding and drill seeding projects would reduce sightseeing and primitive recreation opportunities due to intrusions on scenic and primitive values.

The future trends in recreational use of the WSA are unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate overall recreational use is expected to increase from the 350 current visitor days per year to 522 visitor days at the end of 20 years.

WILDERNESS VALUES

None of the 20,350-acre Spruce Canyon WSA

would be designated wilderness, and management would continue under the Grand Resource Area RMP. Mineral and energy exploration and development could disturb an estimated 180 acres. Naturalness values now existing could be lost in portions of the WSA as a result of this disturbance. Imprints, such as benching roads and drill pads on steep, rocky slopes, would be irreversible. Other surface disturbances (vegetation treatments) would also result in a loss of naturalness, solitude, and outstanding opportunities for primitive and unconfined recreation in the WSA.

The WSA would not be managed to preserve opportunities for solitude; however, the presence of rugged terrain could preserve solitude opportunities in small areas. Topographic and vegetation screening would be altered in areas of surface disturbance. The most significant effect on opportunities for solitude would be the sights and sounds of surface-disturbing activities and associated vehicle use. This would reduce the visitors' opportunity to find a secluded spot in the WSA.

LAND USE PLANS AND CONTROLS

Land use plans dealing with the area encompassed in the WSA are the *Grand County Master Plan* and the BLM Grand Resource Area RMP. Implementation of this alternative would not change the present or expected use of the lands in the WSA and would be consistent with the multiple-use concept of those plans. This alternative would also be consistent with the management philosophy of the State of Utah which emphasizes economic return from State school sections.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil, gas, and coal in the WSA were developed it could lead to a significant increase in employment and income for Grand County, Emery County, Utah and Mesa County, Colorado would not receive a significant increase in employment and income. However, the probability of economic development of minerals within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no change in the ability to maintain, replace, and build new range developments. The proposed developments that would produce 68 AUMs of new allocated forage could lead to \$1,360 of livestock sales and \$340 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 172 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 14,700 acres in the WSA open to oil and gas leases that are currently not leased. If leased they would bring up to \$44,100 additional Federal lease fee revenues per year in addition to new royalties from lease production and bonus bids from new leases in the KGS. Half of these monies would be allocated to the State, a portion of which could reach the local economy. An undetermined acreage of coal could also be leased in the WSA resulting in additional Federal lease fee revenues, royalties, etc. Collection of livestock grazing fees (approximately \$773 per year) would continue. The additional 68 AUMs that would be produced by proposed range improvements and allocated to livestock under this alternative could increase Federal revenues by \$95 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (20,350 Acres)

As noted in the Description of the Alternatives section, the major changes that could occur in the 20,350-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in oil and gas leasing Category 4 (closed to leasing). All 20,350 acres would also be closed to ORV use, except for approvals by BLM. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing pre-FLPMA oil and gas leases in the KGS or held by unitization would be developed and 40 acres of disturbance would occur. Oil and gas leases not under production or capable of production would not be renewed and future leasing of oil and gas, as well as any other leasable mineral resource (e.g., coal) would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) The 452-acre burning and seeding and 90-acre drill seeding projects would not be allowed.

SPRUCE CANYON WSA

Because potentially disturbed areas would be smaller than under the No Action Alternative (40 vs. 180 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, and forest resources under the All Wilderness Alternative would be insignificant. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

SOILS

It is estimated that up to 40 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.72 cubic yard/acre/year. Soil loss on disturbed areas in the WSA is estimated at 11.7 cubic yards/acre/year. Therefore, soil loss on the 40 acres would increase from 29 cubic yards/year to 468 cubic yards/year. This high rate of potential soil loss would be attributed to the steep terrain on the majority of the WSA. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 439 cubic yards over current annual soil loss. This increase is 1,537 cubic yards less than what could occur under the No Action Alternative.

WATER RESOURCES

Restraints on mineral development would protect water quality. The potential for increased soil erosion and sediment yield from 40 acres of mineral-related disturbance would be significantly less than changes in water quality discussed under the No Action Alternative. However, under this alternative, benefits to the watershed from the 452-acre burning and seeding and 90-acre drill seeding projects would be foregone.

Mineral exploration and development in the area would be generally confined at or near the surface or with widely spaced wells and would not be expected to significantly alter ground water flow or reduce ground water quality.

Additional reservoirs or expansion of existing developments could not occur under this alternative. The development of water improvement structures planned for Diamond and Cottonwood Creeks would not occur under this alternative unless they could be constructed by other than mechanical means. Downstream damage from runoff would continue.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Designation of the WSA would have only a small impact on exploration and production of oil and gas. Post-FLPMA leases (currently covering 280 acres of the WSA) would likely expire without production because they would be subject to stringent wilderness stipulations. No new leases would be issued. Undiscovered oil and gas resources in post-FLPMA lease areas and in currently unleased areas could not be explored or produced. However, potential of the WSA is estimated by SAI to be less than 10 million barrels of oil in-place and less than 60 billion cubic feet of natural gas in-place, which is generally a low favorability. Of these amounts, 3 million barrels of oil and 18 billion cubic feet of natural gas are estimated recoverable. If it is assumed that the WSA provides uniform potential for oil and gas, approximately 74 percent of the resource could be foregone. Some of the more favorable areas surrounding the WSA have been explored and developed and 5,370 acres of pre-FLPMA leases within the WSA are held by unitized production. Within the WSA, however, rough terrain characteristics, combined with a lower potential, have resulted in minimal interest. Thus, it is concluded that resource exploration and development within the WSA would be costly, but may occur in the future on pre-FLPMA leases due to favorability occurring adjacent to the WSA.

Oil Shale and Tar Sand

The potential for the occurrence of tar sand exists within the WSA, with less than 10 million barrels of oil in-place. Less than 3 million barrels are considered recoverable and could be foregone. Also, less than 15 gallons per ton of oil shale exist, with less than 3 million gallons recoverable that would not be available for leasing. However, these are marginal resources that would not be expected to be developed even under the No Action Alternative. The WSA has not been leased for hydrocarbons, and leasing would not occur under this alternative.

Coal

There is a high probability that moderate amounts of recoverable coal underlie the WSA, although the coal is of poor quality and seams average less than 2 feet thick. No leases for this resource exist and none would be issued under this alternative. Thus, the potential for the development of recoverable coal would be foregone (10 to 60 million tons in-place).

Locatable Minerals

The potential exists for a deposit of less than 500 tons of uranium oxide. Development work, extraction, and patenting would be allowed to continue on valid claims (currently there are no claims within the WSA) after wilderness designation under unnecessary or undue degradation guidelines with consideration given to wilderness values. All other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981a). Due to low potential for locatable minerals, it is assumed that locatable minerals would not be explored or developed.

WILDLIFE

Wildlife would benefit by the preservation of solitude due to a reduction in mineral-related surface-disturbing activities (only 40 acres). Species sensitive to human presence throughout the WSA could move out of the disturbed areas and may not return after activities have ceased. However, no significant habitat loss or reduction in animal numbers would be anticipated.

No wildlife management facilities have been proposed for the WSA. The planned 452 acres of burning and seeding and 90 acres of drill seeding projects could not occur under this alternative and possible increases in forage would not be realized.

Habitat for endangered, candidate, and BLM sensitive species that may be in the WSA would receive more protection from surface disturbance under this alternative than the No Action Alternative. Because of this and because necessary measures would be taken to protect these animals as discussed in the No Action Alternative, it can be reasonably concluded that the viability of populations of these species would be preserved under the No Action Alternative.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Grand Resource Area RMP. The 552 AUMs currently allocated in the WSA would remain available for cattle forage. Development of future roads or other livestock management facilities for use with the 552 AUMs in the WSA could be restricted to preserve wilderness values. Since very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected.

Within the WSA, rangeland improvements of short-gap fences would be maintained as in the

past, based on practical necessity and reasonableness. New rangeland developments would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. The planned 452-acre burning and seeding and 90-acre drill seeding projects would not be allowed and the resulting gain of approximately 68 AUMs would not be realized.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through management under VRM Class I (which generally allows for only natural ecological change), through ORV closure, and through closure of the entire area to future mineral leasing and location.

Under this alternative, surface disturbance would be reduced from the 180 acres projected for the No Action Alternative to 40 acres, associated with development of existing oil and gas leases. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. Because the potential disturbance is only 40 acres and the potential for development of mining claims is low, visual quality would probably not be reduced in the WSA as a whole.

CULTURAL RESOURCES

There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities.

RECREATION

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could also lead to an undetermined increase in primitive recreational use above the baseline rate. Judging from use densities of a number of well known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distri-

SPRUCE CANYON WSA

bution about the WSA; and the availability of similar sites; it is estimated that following designation use could be as much as 2,035 visitor days per year (USDI, BLM, 1985). This is 1,685 visitor days over the area's current estimated 350 annual visitor days.

Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. The few visitor days of ORV play activity and/or vehicular hunting and sightseeing in the WSA that could occur without designation would be eliminated from the WSA. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would not experience an overall decline in the vicinity of the WSA. As recreation use increases commercial operations based on primitive recreational activities could apply for use of the WSA.

Mineral-related surface disturbance (in the form of roads or drill pads) on up to 40 acres could cause localized impairment of primitive recreational values in the WSA.

WILDERNESS VALUES

The entire WSA (20,350 acres) would be designated as wilderness, thus preserving wilderness values. Naturalness and opportunities for solitude and primitive and unconfined recreation would be maintained throughout the WSA, except on up to 40 acres that could be disturbed due to oil and gas development of pre-FLPMA leases. This disturbance could have long-term effects on wilderness values in localized areas, but would not be expected to significantly affect wilderness values in the area as a whole.

Visitation to the WSA for primitive recreation could be expected to increase from about 350 visitor days to about 2,035 visitor days annually. The major portion of this use would be for hiking, hunting, sightseeing, and camping. It is not anticipated that this recreation use increase would significantly affect wilderness values.

The WSA is adjacent to two other BLM WSAs and a State roadless area. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

LAND USE PLANS AND CONTROLS

If State lands (one section) within the WSA are purchased or exchanged for lands outside the WSA, wilderness designation would not conflict

with the policy of the State of Utah to maximize economic returns. The BLM Grand Resource Area RMP does not provide for wilderness designation of the Spruce Canyon WSA. Congressional designation of the WSA as wilderness would be an amendment to the RMP. Designation would not be consistent with the *Grand County Master Plan* which favors maximizing mineral development and maintaining existing uses.

SOCIOECONOMICS

Overall there would be no significant changes in current trends of population, employment, and local income distribution resulting from wilderness designation of the Spruce Canyon WSA.

Because of restrictions placed on the use of resources under wilderness designation there could be losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 10) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases could be developed but designation would preclude new leases and mining claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$11,040 of livestock sales including \$2,760 of ranchers' return to labor and investment. Proposed developments for livestock would be foregone along with any resulting increase in ranchers' income. Two such improvements have been proposed (a 452-acre burning and seeding and a 90-acre drill seeding project). If these projects were to be implemented and the additional 68 AUMs gained, ranchers' returns to labor and investment would increase by \$340.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section).

SPRUCE CANYON WSA

Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

Recreation expenditures from the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of the WSA and the adjoining WSA over the past 3 years. With designation, they could probably charge more per trip. It is also probable that additional outfitters would use the area if it were designated wilderness, both for hunting and other primitive recreational uses.

Expenditures associated with recreation in the WSA would be well distributed among businesses in Green River and Moab, Utah with some spillover into western Mesa County, Colorado. However, the resulting local expenditures would be regionally insignificant. Other than to recreation outfitters, recreation expenditures would also be

locally insignificant to any single business in the affected area.

The eventual loss of the 280 acres of post-FLPMA oil and gas leases would cause an eventual loss of up to \$840 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$44,100 annually in Federal revenues from the 14,700 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in the KGS area could also be foregone.

If the proposed range improvements are not developed and used, an estimated annual \$96 of Federal grazing revenues from 68 increased AUMs would be foregone.

Wilderness designation would eliminate most woodland product harvesting and related Federal revenues. No harvest is presently occurring.

No existing rights-of-way or permits would be eliminated through wilderness designation.

BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. October 1979. Salt Lake City, Utah.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1972. "Grand Resource Area Unit Resource Analysis" (unpublished document). January 12, 1972. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979. *Interim Management Policy and Guidelines for Lands Under Wil-*

SPRUCE CANYON WSA

- derness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981a. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981b. "Book Mountain Transportation Plan" (unpublished document). December 1981. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Proposed Management Plan and Environmental Impact Statement*. December 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Natural Resources. 1976. "Roadless Area Adjacent to Spruce Canyon Wilderness Study Area" (personal communication). July 30, 1976. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Flume Canyon WSA



FLUME CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	4
Alternatives Considered and Eliminated from Detailed Study	4
Alternatives Analyzed	4
No Action Alternative (Proposed Action)	4
All Wilderness Alternative	6
Summary of Environmental Consequences	8
AFFECTED ENVIRONMENT	8
Air Quality	8
Geology	8
Soils	10
Vegetation	10
Water Resources	11
Mineral and Energy Resources	11
Wildlife	15
Forest Resources	15
Livestock and Wild Horses/Burros	16
Visual Resources	16
Cultural Resources	16
Recreation	17
Wilderness Values	17
Land Use Plans and Controls	18
Socioeconomics	18
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	20
Analysis Assumptions and Guidelines for All Alternatives	20
No Action Alternative (Proposed Action)	21
All Wilderness Alternative	25
BIBLIOGRAPHY	31

FLUME CANYON WSA (UT-060-100B)

INTRODUCTION

General Description of the Area

The Flume Canyon Wilderness Study Area (WSA) lies in the Book Cliffs region of north-central Grand County, Utah. It contains approximately 50,800 acres of BLM-administered lands. The *BLM Intensive Wilderness Inventory* (USDI, BLM, 1980) indicated a WSA size of 48,240 acres. An additional 3,250 acres were added to the WSA following an Interior Board of Land Appeals (IBLA) decision remanding portions of the WSA. Other differences are attributable to Master Title Plat checks and a dedicated right-of-way north of the Pear Park Gas Field, which eliminated approximately 690 acres. Within the WSA boundaries are six sections of State lands totaling 3,811.8 acres. The WSA is of irregular configuration, roughly 14 miles east-west and 10 miles north-south at its widest point.

The WSA has a semiarid high desert climate. Average annual precipitation ranges from 12 to 17 inches. Annual temperatures range from 100 degrees Fahrenheit (F) to -20 degrees F.

Flume Canyon WSA lies entirely in the rugged terrain between the face of the Book Cliffs and the top of the Roan Cliffs. It is a dissected landscape of steep ridges and V-shaped canyons formed by the many drainages leading north to Westwater Creek Canyon along the northern boundary of the WSA, east to Sulphur Creek and Antone Wash, and south to Diamond Canyon along the southern boundary. Flume Canyon runs south in the central part of the WSA. Elevations range from 8,500 feet along Westwater Point in the northwestern part of the WSA to 5,100 feet at the mouth of Long Canyon in the southern tip of the WSA. The 300-foot face of the lower Book Cliffs, visible for miles along Interstate 70 (I-70), lies just south of the WSA.

Predominant vegetation is pinyon-juniper woodland, Douglas fir forest, mountain shrub, and high desert plant communities along the lower elevations.

The nearest towns to the WSA are the small communities of Thompson, Utah (located about 20 air miles southwest of the WSA); Cisco, Utah (located about 18 air miles, south of the WSA); and Mack, Colorado (about 20 air miles southeast of the WSA). Flume Canyon is the easternmost of seven contiguous WSAs. The adjoining WSA is Spruce Canyon.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the Grand Resource Area are discussed in Volume I. Several concerns pertaining to the wilderness study process and/or the environmental analysis process were raised during scoping. These concerns are discussed in the Scoping section of Volume I rather than in individual analyses of WSAs.

Eighteen specific issues pertaining to the Flume Canyon WSA were identified through the public scoping process (USDI, BLM, 1984) and are responded to below:

1. *Comment:* In the Site-Specific Analysis (SSA), the analysis of impacts to energy and critical resources failed to quantify or state how there would be adverse impacts when the economic feasibility of development (meeting the prudent man test) is remote. The mere presence of pre-FLPMA (Federal Land Policy and Management Act) oil and gas leases is not sufficient cause to eliminate the WSA. The analysis should indicate the need and potential for minerals.

Response: The Mineral and Energy Resources sections of this document discuss the mineral potential of the WSA in terms of in-place and recoverable resources. The impact analysis for minerals evaluates each alternative in terms of the type and amount of minerals that could be developed, the likelihood of such development, and the types and amount of minerals potentially foregone.

2. *Comment:* The analysis should consider minerals and other resources available outside the WSA and the effect of lost lease royalties on local socioeconomics.

Response: The impact analysis focuses on resources both inside and outside of the WSA that would be affected by the alternatives. The loss of lease revenues and potential royalties



FLUME CANYON WSA

is specifically discussed in the socioeconomic impact analysis of the All Wilderness Alternative.

3. *Comment:* Do questionable low-to-medium oil and gas potential (f2) and moderate coal tonnage outweigh wilderness values?

Response: Impacts to minerals and wilderness resources are analyzed under each alternative. BLM will consider these values in making its recommendation to Congress for or against wilderness designation. Congress will make the final determination as to which is the overriding value.

4. *Comment:* What criteria and systematic analysis were used to evaluate the relative values of competing resources? These factors must be applied consistently in all the SSAs.

Response: The impact of each alternative on each affected resource is discussed. An attempt has been made to consistently apply the analysis to all WSAs. Also, refer to the previous response.

5. *Comment:* Would there actually be a problem of manageability with respect to pre-FLPMA oil and gas leases?

Response: The affect that wilderness designation and nondesignation would have on pre-FLPMA leases is discussed in the Mineral and Energy Resources sections of this document. Upon expiration, leases would not be reissued in a designated wilderness area unless a find in commercial quantities has been made. Therefore, it is unlikely that pre-FLPMA oil and gas leases would be reissued after expiration or that there would be a wilderness manageability problem. Overall manageability of each WSA is addressed in Volume I.

6. *Comment:* Cost-benefit analyses are needed to identify wilderness economic tradeoffs.

Response: BLM does not believe that a cost-benefit analysis or any other comparison based solely on economic considerations can properly portray tradeoffs involved. This is because: (1) many of the values related to wilderness are intangible; (2) market conditions that affect consumptive resources are highly variable over time; (3) the wilderness study criteria do not lend themselves to cost-benefit interpretations; and (4) the numerous

and divergent factors that contribute to wilderness considerations would make a meaningful cost-benefit analysis very difficult, if not impossible. BLM believes that it can serve best by narrating the situation and offering a recommendation that can be pursued in the political and legislative forums.

7. *Comment:* What local economic effects would wilderness designation create?

Response: Local economic impacts of wilderness designation are discussed in the Environmental Consequences, All Wilderness Alternative. Reductions in annual local sales and potential Federal revenues would be expected. However, economic impacts resulting from wilderness designation would be minor.

8. *Comment:* Would wilderness designation be consistent with local and State land use planning?

Response: Impacts on State and local land use plans are discussed under each alternative. Because State in-holdings would be exchanged, wilderness designation would not conflict with the State policy of maximizing economic returns. However, designation would be inconsistent with the Grand County policy of maximizing mineral development.

9. *Comment:* Maps and charts in the SSA are poorly defined and difficult to interpret.

Response: The maps have been redrafted to more clearly show land status and the boundaries of the WSA.

10. *Comment:* Many impacts could occur if this WSA were not designated wilderness. What would happen to permittees' forage if full-scale development were to take place? What about watershed?

Response: As identified in the Environmental Consequences section, under the No Action Alternative, potential surface disturbance would reduce vegetation quantity, water quality, and livestock forage until reclamation is completed.

11. *Comment:* Worst-case analysis in the SSA was applied in a biased manner. Because only 0.1 visitor day per acre is predicted, any increase in popularity of the region was discounted.

Response: Visitor-use increases are discussed in the Environmental Consequences, Recreation sections of both alternatives. It is

estimated that, after wilderness designation, visitor use could increase from its current rate of up to 350 visitor days annually to as much as 5,080 visitor days annually. This judgment was made using several factors including: use densities of a number of well known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distribution around the WSA; and the availability of similar sites. This possible use increase considers Flume Canyon only. As discussed in Volume I, use of the WSAs would probably not reach this level if all WSAs in the region were designated wilderness.

12. *Comment:* The recreation opportunities discussion in the SSA did not use BLM's own Recreation Opportunities Spectrum (ROS). Descriptions are not experience oriented.

Response: Descriptions of recreational opportunities, including both existing and potential recreational uses, can be found in the Affected Environment, Recreation and Wilderness Values sections. For a more complete ROS discussion on recreation opportunities, refer to the BLM Moab District Office.

13. *Comment:* How would permittees be affected by nonwilderness?

Response: As discussed in the No Action Alternative, Livestock section, livestock use would be managed under the Grand Resource Area Resource Management Plan (RMP) (USDI, BLM, 1983). Permittees would continue use of their allocated Animal Unit Months (AUMs) and could maintain range improvements as in the past. New rangeland improvements could be developed without consideration given to protecting wilderness values.

14. *Comment:* Justification given for the no wilderness recommendation in the SSA is that wilderness values are outweighed by resource values, particularly oil and gas. How was this determined? The criteria and systematic approach used to arrive at this decision must be answered consistently for all the SSA evaluations.

Response: During scoping for this Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five

Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

15. *Comment:* The Draft SSA failed to quantify statements but uses "numerous, high, low, lack of" etc.

Response: Where possible the analysis in this EIS makes quantified statements based on uniform assumptions.

16. *Comment:* What assumptions were used for analysis in the SSA? How was "No Action" incorporated into "No Wilderness"?

Response: Assumptions used for the analysis can be found in the Description of the Alternatives and Environmental Consequences of Alternatives sections. There are two alternatives for this WSA, No Action and All Wilderness. The WSA will either be recommended for designation to Congress (All Wilderness Alternative) or managed under BLM's Grand RMP (No Action). The No Action Alternative is synonymous with No Wilderness in this analysis.

17. *Comment:* Is it an analysis assumption that Congressional designation could override specific management actions?

Response: Where management intentions have not be clearly identified, assumptions are made based on management projections for each alternative. This is done to allow impact analysis resulting from implementation of each alternative. Projected management under the All Wilderness Alternative is, of course, subject to management requirements set by Congress in any law designating the area as wilderness.

18. *Comment:* The oil and gas (mineral) potential of the WSA is ranked low by Science

FLUME CANYON WSA

Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be at least moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated From Detailed Study

During early studies, BLM considered an alternative to designate this as an Area of Critical Environmental Concern (ACEC). This alternative was not considered because other management options allow for protection of the particular resources of concern (i.e., watershed and wildlife). No alternatives were identified for this WSA during scoping other than those analyzed. A partial alternative was not identified because the potential for conflicts with natural features occurs consistently throughout the WSA.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (50,800 acres). Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE (PROPOSED ACTION)

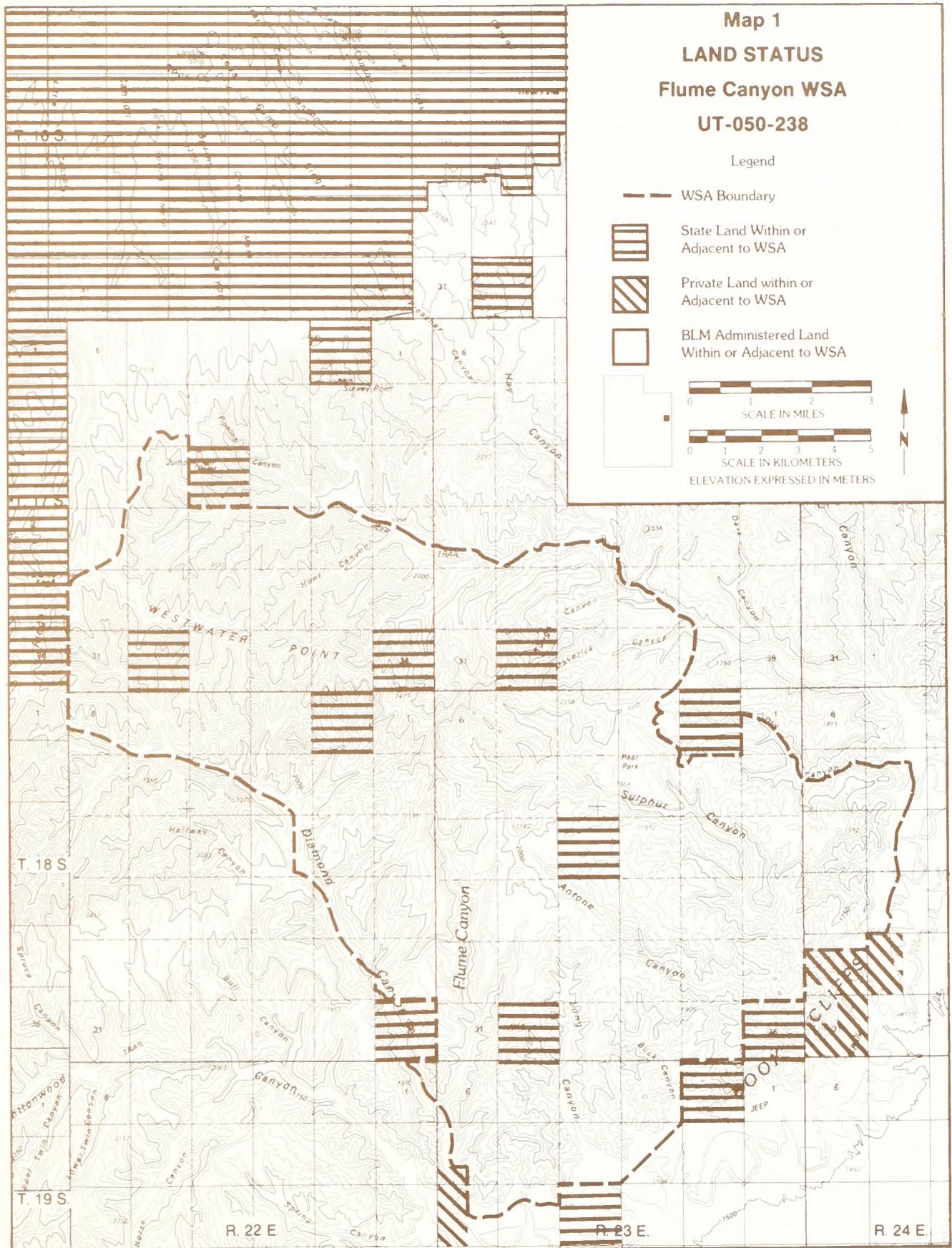
Under this alternative, none of the 50,800-acre Flume Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed for multiple uses in accordance with the Grand Resource Area RMP (USDI, BLM, 1983). Six sections (3,811.8 acres) of State land within the WSA (refer to Map 1) have

not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed in this alternative as remaining under State ownership.

The following are specific actions that would take place under this alternative:

- Approximately 30,320 acres not covered by an oil shale withdrawal would remain open to mineral leasing, location, and sale. The remaining 20,320 acres in the WSA are covered by an oil shale withdrawal and would remain closed to mineral location. Development work, extraction, and patenting would be allowed on existing (4,740 acres) and future mining claims. Development would be regulated by unnecessary or undue degradation guidelines (43 Code of Federal Regulations [CFR] 3809), without consideration for wilderness values. Existing and future oil and gas leases could be developed without consideration given to protecting wilderness values. Existing oil and gas leases could be developed under Category 1 (standard stipulations); new leases could be issued under Category 2 (standard and special stipulations) on 48,800 acres and Category 1 on 2,000 acres. The special stipulations would restrict use to protect watershed and wildlife.
- Domestic livestock grazing use of the Flume Canyon WSA would be carried out as authorized in the Grand RMP (currently 1,904 AUMs). Existing rangeland developments (short-gap fences) could be used and maintained, and new rangeland developments (including a 106-acre burning project currently planned in the southern part of the WSA) could be implemented without wilderness considerations.
- Development of facilities and improvements for wildlife, water resources, etc. could be allowed if in conformance with the BLM planning documents. Instream drop structures are planned in Diamond and Westwater Creeks to improve water quality and reduce sediment yield.
- The entire WSA acreage would continue to be open to off-road vehicle (ORV) use; however, such use would have terrain limitations.
- The entire 50,800-acre area would be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.

FLUME CANYON WSA



FLUME CANYON WSA

- The area would continue to be managed under Visual Resource Management (VRM) Class II (32,500 acres), Class III (15,760 acres), and Class IV (2,540 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources. Except for the areas planned for prescribed burns (106 acres), the entire area would be managed under a limited fire suppression policy.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried out in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

Under this alternative, all 50,800 acres of the Flume Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, six sections (3,811.8 acres) of State land within the WSA (refer to Map 1) and one section adjacent to the WSA (640 acres) would be transferred to Federal ownership by purchase or exchange. Other State land adjacent to the WSA would not be exchanged. Refer to Volume I for a further discussion of State land acquisition. The figures and acreages given under this alternative are for Federal lands only. Private lands exist in two locations adjacent to the WSA (refer to Map 1) but there are no private or split estate lands located within the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 50,800 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed to continue on that portion of the approximately

4,740 acres of existing mining claims that may be determined to be valid. Development would be subject to unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to protecting wilderness values. Existing oil and gas leases involving about 38,265 acres would be phased out upon expiration unless a find of oil or gas in commercial quantities is shown. No new oil and gas leases would be issued.

- Present domestic livestock grazing would be carried out as authorized in the Grand RMP and related Allotment Management Plans. The 1,904 AUMs of livestock forage in the WSA would remain available to livestock. After designation existing rangeland developments (short-gap fences) could be maintained in the same manner as in the past based on practical necessity and reasonableness. New rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. The planned burning and seeding project on 106 acres likely would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). The planned instream drop structures in Diamond and Westwater Creeks likely would not be allowed unless designed to blend with the wilderness environment and constructed of natural materials by hand methods.
- Wildlife transplants or developments would be allowed after designation only if compatible with wilderness values. Currently, there are no wildlife developments in the WSA and none are specifically planned (other than the burning and seeding project noted in the livestock discussion above).
- The entire 50,800-acre area would be closed to ORV use except for: (1) users with valid existing rights if approved by

FLUME CANYON WSA

Map 2 ALL WILDERNESS ALTERNATIVE Flume Canyon WSA UT-060-100B

Legend

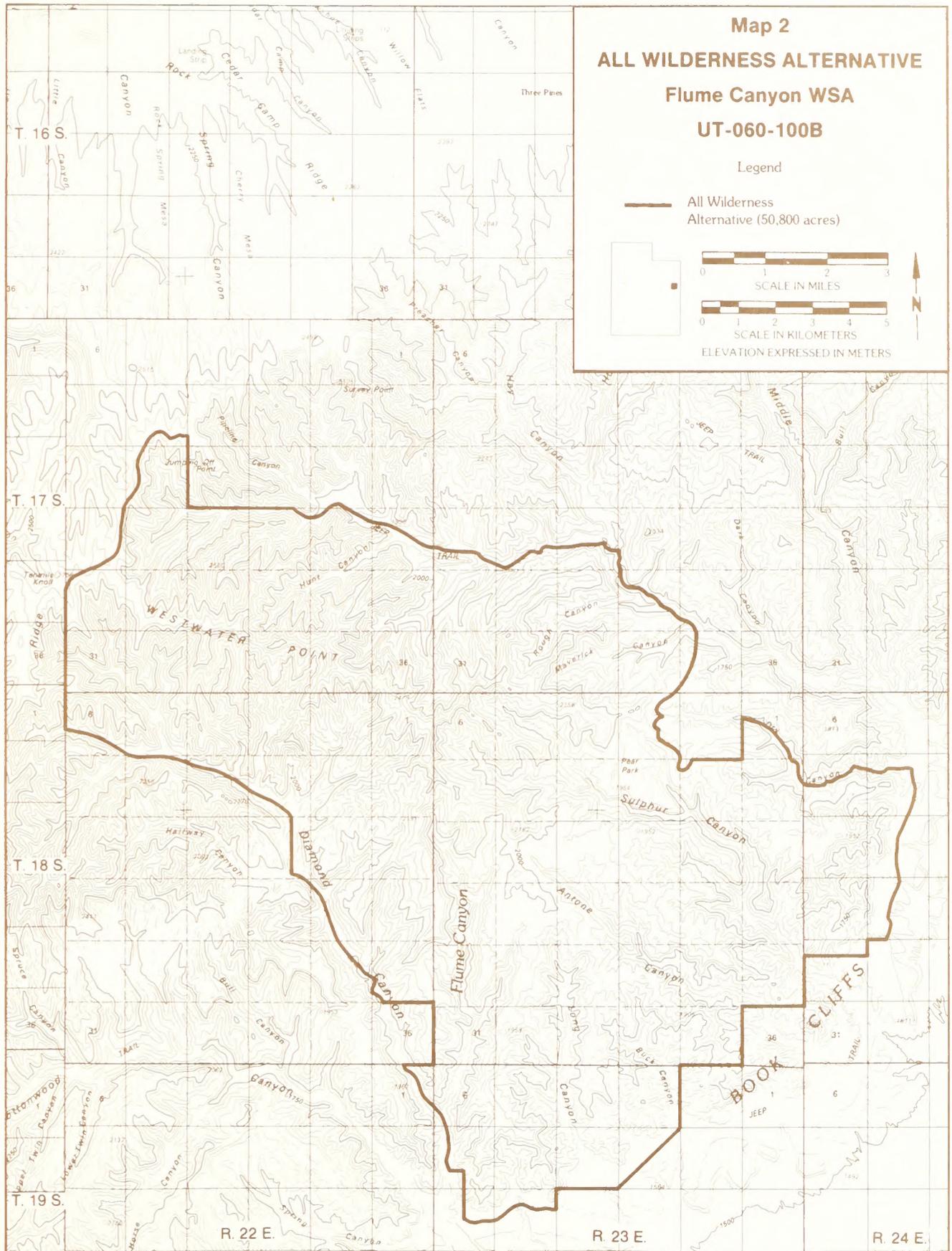
— All Wilderness
Alternative (50,800 acres)



0 1 2 3
SCALE IN MILES

0 1 2 3 4 5
SCALE IN KILOMETERS

ELEVATION EXPRESSED IN METERS



FLUME CANYON WSA

BLM in accordance with 43 CFR provisions; or (2) for occasional and short-term vehicular access approved by BLM for maintenance of approved livestock developments. About 9 miles of vehicular ways could not be traversed by vehicles. These include 4.5 miles of ways in Long Canyon, a 1.5-mile abandoned way, and a 3-mile jeep trail to Westwater Point. About 30 miles of roads or jeep trails border the WSA and these would be allowed to remain open to vehicle use.

- A specific Wilderness Management Plan would be developed to govern use and protection of the 50,800-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads or jeep trails that are adjacent to or dead-end at the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources in the WSA would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to aerial or hand techniques.
- Any activity for the purpose of gathering information about natural resources would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or per-

manent structures unless no other feasible alternatives exist.

- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. Approval of a predator control program would be contingent upon a clear showing that removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA has a Prevention of Significant Deterioration (PSD) Class II air quality classification (1977 Clean Air Act Amendments). The nearest Class I area is Arches National Park, about 30 air miles south. Canyonlands National Park, another Class I area, lies about 60 air miles to the southwest. No significant sources of air pollution are close enough to affect the WSA. Visibility from higher elevations of the WSA average 30 to 100 miles and is important because of scenic vistas from the WSA across the Book Cliffs and Cisco Desert.

Geology

The WSA is in the Book Cliffs, a physiographic feature that runs from west of Rifle, Colorado to northwest of Price, Utah. It is part of the Uinta Basin Section of the Colorado Plateau Physio-

FLUME CANYON WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
FLUME CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (50,800 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil, 18 billion cubic feet of natural gas, 7 to 13 million tons of coal, 3 million barrels of oil from tar sand, and 500 tons of uranium oxide.	Oil, gas, coal, and tar sand likely would not be recovered. Assuming a worst-case analysis, uranium recovery would also be foregone. Due to the low likelihood of recovery of these mineral resources, however, the loss of development would not be significant.
Wildlife	Less than one percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 1,904 AUMs and maintenance of existing developments would continue. New developments could be implemented; however, none are now proposed.	Grazing of 1,904 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 286 acres.	Visual quality could be impaired on up to 139 acres.
Recreation	ORV use could continue on 9 miles of ways. Overall recreational use could increase from the present 350 visitor days per year to 522 over the next 20 years. Up to 180 acres of mineral-related disturbance and 106 acres of land treatment could reduce the quality of primitive recreation.	The WSA, including 9 miles of ways, would be closed to ORV use. Primitive recreational use could increase to up to 5,080 visitor days per year over the next 20 years due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 286 acres (0.5 percent of the WSA).	Wilderness values would be protected, except on up to 139 acres (0.2 percent of the WSA) which may be disturbed by development of valid mineral rights.
Land Use Plans and Controls	This alternative would be consistent with the <i>Grand County Master Plan</i> , State of Utah plans and policies, and the current BLM Grand RMP.	This alternative would not be consistent with Grand County's concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute amendment of the BLM Grand RMP.
Socio-economics	Annual local sales of less than \$63,215 and Federal revenues of up to \$117,611 would continue. An additional \$37,605 per year in Federal revenues could be derived from leasing of presently unleased areas. Up to \$260 in local sales and \$18 in Federal grazing fees could be derived annually from increased AUMs resulting from land treatment.	Annual local sales of less than \$63,215 and Federal revenues of up to \$2,666 would continue, but Federal revenues of up to \$67,200 from mineral leasing would be eventually foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA, and \$260 in local sales and \$18 in Federal revenues derived from land treatment for grazing would be lost.

FLUME CANYON WSA

graphic Province. Elevations range from 5,100 feet in the southern portion of the WSA to 8,500 along Westwater Point in the northwestern portion of the WSA.

The WSA lies along the south-facing Book Cliffs escarpment, with parts extending northward into the Roan Cliffs. The tract is underlain by sedimentary rocks of Cretaceous and Tertiary age. At the base of the tract along its southeastern side, the Mancos Shale and the Mesa Verde Group interfinger in a complex pattern of alternating marine shale and continental sandstone. These rocks are overlain by the main part of the Mesa Verde Group, which in turn is overlain by interfingered strata of the Wasatch and Green River Formations. In the northwestern part of the WSA, the oil shale rich Parachute Creek Member of the Green River Formation crops out in an irregular bank (specifically, the Mahogany oil shale bed). All strata in the vicinity of the WSA dip gently northward into the Uinta Basin.

The WSA is underlain by several sandstone units that are hydrocarbon producers in the vicinity, notably the Cedar Mountain, Entrada, and Navajo. The Morrison and Chinle Formations, known as major uranium producers in other areas of southeastern Utah, are also present at depth; however, indications are that ore formation did not occur in the Book Cliffs region. Some localized deposits of uranium occur in the Wasatch Formation. Differential erosion of the layers of sandstones and shales has created the distinctive banded appearance characteristic of the Book Cliffs. In the higher elevations towards the Roan Plateau, slopes lose the stepped appearance and landforms become sharper and more pyramid-shaped. Some erosional features of scenic interest occurring within the WSA are pinnacles, balanced rocks, alcoves, overhangs, potholes, pockmarks, and arches.

Soils

Flume Canyon WSA is characterized by steep canyons. About 65 percent of the area is composed of shallow to deep stony soils on steep sides of canyons and mountains. About 20 percent is composed of deep loamy soils on steep mountainsides. About 5 percent is very deep loamy soils along drainages on canyon floors, while about 10 percent is composed of rock outcrop occurring as cliffs and ledges. Erosion throughout the WSA is critical because of steep slopes and a tendency towards flashflooding. Erosion is generally natural in origin, from both wind and water. Refer to Table 2 for soil characteristics and land types in the WSA. Erosion estimates for the WSA are found in Table 3.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock Outcrop	10	5,080	—	—
Shallow or deep stony soils on steep canyon sides and mountainsides	65	33,020	1	10
Deep loam soils on steep mountainsides	20	10,160	1	20
Very deep loamy soils on gently sloping alluvial fans	5	2,540	0.1	1
Totals	100	50,800	—	—

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions			Annual Soil Loss if Disturbed		
		Percent of Area	Acres	Cubic Yards	Percent of Area	Acres	Cubic Yards
Very High	20	—	—	—	20	10,160	203,200
High	10	—	—	—	65	33,020	330,200
Medium	5	—	—	—	—	—	—
Low	1	85	43,180	43,180	5	2,540	2,540
Very Low	0.1	5	2,540	254	—	—	—
None	0	10	5,080	0	10	5,080	0
Totals		100	50,800	43,434 ¹	100	50,800	535,940 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.86 under present conditions; 10.55 if disturbed.

No agricultural activity takes place within the WSA. There are existing farm fields within 0.50 mile of the WSA at the mouth of Westwater Creek Canyon and adjacent to the WSA at the mouth of Diamond Canyon. There is a possibility for agricultural development on 160 acres along Westwater and Diamond Creeks where there are favorable soils, but the short growing season (less than 110 days), erodibility of soils, and potential for flashfloods limit feasibility.

Vegetation

Existing vegetation is predominantly pinyon-juniper woodland of varying density, with high desert plant communities found along the lower elevations in the southern portion of the WSA. Mountain shrub communities are found along ridgetlines towards the Roan Cliffs, especially on

FLUME CANYON WSA

north-facing slopes. Ponderosa pine, Douglas fir, aspen, cottonwood, and box elder trees are found in the WSA along with serviceberry, snowberry, cliffrose, mountain big sagebrush, shrub willow, cacti, grasses, and forbs. About 5 percent of the WSA has riparian-sagebrush communities, occurring in canyon bottoms and along water courses such as Diamond and Westwater Creeks. Vegetation communities are localized depending on elevation, availability of water, and slope aspect.

The WSA is split by the Rocky Mountain Forest Province and the Colorado Plateau Physiographic Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types within the WSA are juniper-pinyon woodland at central elevations and mountain mahogany-oak scrub at higher elevations. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site. Tables 4 and 5 indicate existing and potential natural vegetation (PNV) types for the WSA.

There are no known threatened, endangered, or sensitive plant species in the WSA.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Douglas fir forest	11,105	22
Pinyon-juniper/Douglas fir/Aspen/Mountain shrub	22,910	45
Pinyon-juniper/Mountain shrub/Salina wildrye	12,832	25
Riparian/Sagebrush	2,640	5
Shadscale/Salina wildrye	1,313	3
Total	50,800	100

Source: USDI, BLM, 1983.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Mountain mahogany/Oak scrub	9,690	19
Juniper-pinyon woodland	41,110	81
Total	50,800	100

Source: USDI, Geological Survey, 1978.

Water Resources

The major drainages in this WSA are Diamond, Flume, Westwater, Antone, and Sulphur Canyons. Diamond Creek is a perennial stream, flowing within the WSA for approximately 7.5 miles; other drainages are intermittent. Two of the major drainages of the WSA, Diamond Creek and Westwater Creek, have been identified as areas damaged by floods and contributing to sediment damage. These drainages have been identified as having potential for watershed treatments to minimize downstream damages. Currently, instream drop structures are planned. Adjacent areas contributing to sediment for runoff would also be considered for treatment following detailed inventories.

There are no known springs or wells in the WSA. Water quality data are lacking for the existing water resources. Generalized data indicate that sediment in streams in the vicinity of the WSA varies from less than 500 to 1,000 milligrams per liter (mg/l).

Mineral and Energy Resources

The WSA lies in an area known for hydrocarbon potential (oil and gas, tar sand, coal, and oil shale). Additionally, prospecting has occurred within the WSA for other minerals, including uranium and possibly placer gold.

The BLM, in consultation with the U.S. Department of Energy, had each WSA within Utah independently assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the SAI rating system. The energy and mineral resource rating summary for this WSA is given in Table 6.

The potential for mineral resources in this WSA is low due to the generally unfavorable geologic environment. However, an overall importance rating (OIR) of 3- (on a 1 to 4 scale, where 4 is equated with high mineral importance) is given for the Flume Canyon WSA. Shades of importance are indicated by + or -. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

No resources in the WSA were assigned favorabilities exceeding f2 (low); however, the petroleum geology of the area and the large size of the tract suggest that numerous small, shallow fields may

FLUME CANYON WSA

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c3	Less than 10 million barrels of oil; less than 60 billion cubic feet of natural gas
Tar Sand	f2	c4	Less than 10 million barrels
Oil Shale	f2	c4	Less than 15 barrels/ton of shale
Uranium/Vanadium	f2	c2	Less than 500 tons
Coal	f2	c4	Low tonnage (14-26 million tons)
Geothermal	f1	c3	None
Hydropower	f1	c4	None
Copper	f1	c1	None
Manganese	f1	c1	None
Potash	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

be discovered in this area and perhaps within the tract. This was considered by SAI as sufficient justification for increasing the OIR from an apparent 2 to the assigned 3-.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by FLPMA. BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. The WSA could contain deposits of vanadium, currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

LEASABLE MINERALS

Oil and Gas

The tract as evaluated by SAI in 1982 contained 54,540 acres. The WSA includes over 93 percent of the tract evaluated. Small areas east and west of the WSA were also evaluated. The SAI rating of f2 (low) for oil and gas indicates that potential exists in the tract for less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. Of this, less than 18 billion cubic feet of gas or 3 million barrels of oil are estimated as recoverable. The future undiscovered potential is with small, relatively shallow fields. The certainty level of c3 indicates a reasonable assumption that oil and gas resources are present, based on the positive drilling data of nearby holes and the numerous nearby fields.

The WSA lies along the southern edge of the Uinta Basin, an important petroliferous province with significant oil and gas production potential. Oil and gas production near the WSA comes from small- to moderate-sized shallow fields produced from the Jurassic Entrada and Morrison Formations and the Cretaceous Cedar Mountain and Dakota Formations. Numerous fields, some shut-in or abandoned, occur in an arc surrounding the WSA. Some lie directly adjacent (Diamond Ridge, Pear Park, Book Cliffs). Leasing and drilling activity has been high in the surrounding area. The geologic environment is favorable for oil and gas resources, especially gas. Small structural traps are likely rather than larger features.

The WSA contains portions of three known geologic structures (KGSs) (refer to Table 7). Three wells were drilled and abandoned within the WSA. Approximately 20 holes have been drilled for oil and gas exploration within 3 miles of the WSA. Of these, one is a gas producer and one an oil producer. These producing holes account for the three KGSs on the WSA boundary and a fourth KGS to the south.

TABLE 7
Special Mineral Designation Areas

Type	WSA Acres	Percent of WSA
Known Geologic Structures A	6,649	13
Known Geologic Structures B	6,245	12
Known Geologic Structures C	2,640	5
P.R. Spring STSA	1,450	3
Oil Shale Withdrawal Areas	20,480	40.3

Source: USDI, BLM, 1983.

FLUME CANYON WSA

It is possible that other small fields could be located within the WSA. The small size of the potential fields accounts for SAI's low favorability rating).

Leasing and drilling activity surrounding the WSA has been high. Some of the fields on the perimeter of the tract include the Book Cliffs, Left Hand Canyon, Bull Canyon, and Cisco Dome. The largest fields in the vicinity of the tract are located 10 to 15 miles to the northeast. San Arroyo, the largest, has produced about 60 billion cubic feet of gas through 1974 since its discovery in 1962. Other relatively large fields in this area include Bar-X (more than 50 billion cubic feet of gas) and Westwater (about 30 million cubic feet of gas). Small structural traps are responsible for the production.

The WSA contains portions of 50 oil and gas leases covering about 38,265 acres (about 75 percent of the area). At least 35 leases (28,000 acres) are held by production. None of the producing wells are within the WSA, but are part of leases with boundaries included both inside and outside of the WSA, with the producing wells located outside the WSA. Within the WSA rough terrain, combined with a lower potential, have resulted in less interest than in nearby areas. The remainder of the WSA (about 25 percent) is unleased but is currently available for leasing (refer to Table 8). The WSA contains a portion of one oil and gas unit agreement involving less than 1 percent of the WSA (refer to Table 8). Unit agreements typically combine several oil and gas leases together into a unit. Such an agreement allows work completed on any one lease within the unit area to apply to all leases. This has implications concerning the drilling required to extend leases. A well drilled outside a WSA within a unit that straddles the boundary would convey lease extension rights to all leases within the unit, including those within the WSA.

TABLE 8
Oil and Gas Leases

Type	WSA Acres	Percent of WSA
Pre-FLPMA	29,110	57
Post-FLPMA	8,755	17
Available for Leasing	12,535	25
Unitized Area (Diamond Canyon Unit II)	400	1
Total	50,800	100

Source: USDI, BLM, 1983.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination dates of existing leases. Approximately 57 percent of the WSA is covered by 35 pre-FLPMA leases.

The area of the WSA was included in the Price District Oil and Gas Environmental Analysis Report (USDI, BLM, 1975), which established oil and gas leasing categories to protect certain resource values. Under this category system, all of the WSA was classified as open (Category 1) with standard stipulations. However, in the Grand RMP the category on 48,800 acres was changed to open with special stipulations (Category 2) restricting winter use to protect critical watershed and elk habitat.

Oil Shale and Tar Sand

According to SAI, the WSA has some potential for both oil shale and tar sand, although none of the WSA is currently leased for these resources. Approximately 20,480 acres in the northern portion of the WSA are included in an oil shale withdrawal. This type of withdrawal, dating to 1930, was made to withdraw oil shale deposits both from oil and gas leases and from mining claim location under the mining law. The SAI rating for oil shale is f2 (low) based on the appearance of a small part of the Mahogany Zone of the Parachute Creek Member. The Mahogany has been under

FLUME CANYON WSA

development for petroleum production in the Grand Junction, Colorado area, but extraction appears economically infeasible at this time. The f2 rating indicates a potential for thin beds of oil shale, with a yield of less than 15 gallons per ton of shale. However, upon BLM field examination it was discovered that the geologic structure of the WSA is not suited to the occurrence of oil shales, and it is highly unlikely that any oil shale beds are found within the WSA.

According to SAI, the same Parachute Creek Member could have some potential for tar sand and is part of the P.R. Spring Special Tar Sand Area (STSA). Approximately 1,450 acres of the WSA are within the STSA, although there are no lease conversion applications for the portion of the STSA within the WSA. The SAI rating of f2 (low) indicates that resource potential in the WSA would be less than 10 million barrels of oil in-place with less than 3 million barrels estimated to be recoverable. Again, upon BLM field examination it was discovered that the geologic structure of the WSA is not suited to the occurrence of tar sand and it is highly unlikely that this resource occurs within the WSA.

Coal and Potash

Other leasable resources produced locally are coal and potash. The WSA has no potential for potash, as it falls far north of the Paradox Basin where potash-bearing salts were deposited.

The SAI rating of f2 for coal indicates that a low tonnage of coal exists within the tract evaluated (approximately 14 to 26 million tons in-place with 7 to 13 million tons estimated recoverable). The WSA represents the northern 24 percent of the coal tract evaluated. The c4 certainty level is assigned based on the hundreds of coal sections measured in and around the tract. The highest potential for coal is within the western end of Coal Canyon WSA, about 15 miles southwest of Flume Canyon WSA. The WSA is higher in the geologic section, northwest of the coal outcrops. The bulk of Utah's coal is produced from Cretaceous rock with minor deposits in Tertiary Formations. The WSA is underlain by these strata, with coal bed outcrops in the southeastern border of the WSA. Most of the WSA lies within the Segó Field which comprises only a small part of the demonstrated coal-reserve base of Utah. The Segó Field was mined from 1912 to the early 1950s but not within the WSA. The coal found within the WSA is of poor quality and occurs in thin (less than 1-foot) beds. There are no coal leases within the WSA. Production is very unlikely.

Geothermal

There has been some interest regionally in geothermal energy sources. The only geothermal potential associated with the WSA is deep-seated, low-temperature thermal waters (between 20 and 90 degrees Centigrade [C]). It seems very unlikely that this resource would ever become economical to develop, considering high drilling costs, the great depth to the resource, the limited use for such low-temperature water, and the small number of potential users. No interest has been expressed for geothermal leases in the vicinity of the WSA.

LOCATABLE MINERALS

The WSA has been rated by SAI as having a low potential (f2) for uranium and negligible potential for other hardrock minerals.

The 20,480 acres in the WSA covered by the oil shale withdrawal is not available for mineral location.

In total, the WSA has 237 mining claims covering 4,740 acres. These claims are current in assessment work; claims not current would be invalid. SAI assigned the tract a rating of f2/c2 for uranium and no rating for gold.

Uranium

The uranium potential would be less than 500 tons of uranium oxide in a geologic environment only marginally favorable for the resource to occur. The certainty level is c2, indicating that limited, but positive data exist within the vicinity.

The nearest important uranium deposits are about 20 miles south in the Salt Wash Member of the Morrison Formation. This formation dips north and underlies the WSA at about 4,000 feet at the south end to almost 10,000 feet at the north end. The Chinle, the other major uranium-producing zone, regionally lies an additional 600 feet below the Morrison. Both are too deep to be considered favorable for production. The Wasatch Formation contains small uranium deposits and covers about 250 acres (0.5 percent of the WSA). There are 420 acres covered by uranium claims.

Gold and Silver

Placer claims cover about 4,320 acres (6 percent of the WSA) on the Book Cliff bench, but no placer deposits containing more than microscopic silver or gold in that area are known to exist.

FLUME CANYON WSA

SALABLE MINERALS

The only potential salable minerals in the WSA are sand and gravel. Potential markets are very small and sources of supply are more readily available than those in this WSA. There is currently no use of these resources, and it is unlikely they would ever be developed.

Wildlife

The WSA provides habitat for a variety of wildlife species. Mule deer, elk, bear, mountain lion, cougar, coyote, bobcat, grouse, chukar partridge, and numerous species of raptors, songbirds, and small mammals can be found throughout the area. The rugged topography and variety of vegetation within this WSA provide wildlife with food, thermal cover, escape cover, and birthing areas. The black-footed ferret, which is endangered, may be found in the general area. Four candidate species may also occur in or near the Flume Canyon WSA. These are the ferruginous hawk, long-billed curlew, Southern spotted owl, and Western yellow-billed cuckoo.

The WSA supports moderate to high populations of big game species. The most common is mule deer. A small number of deer can be found in the area yearlong. Most of these deer are found along the lower portions of the riparian-sagebrush canyon bottoms in the WSA. All of the forage in Pear Park (96 percent of Pear Park is in the WSA) has been set aside for wildlife (deer and elk). Approximately 100 to 180 deer (200 AUMS) inhabit the WSA during the spring through the fall seasons, moving to lower elevations in the winter. The WSA is within the Utah Division of Wildlife Resources' (UDWR) Deer Herd Management Unit 28-B, and comprises about 9 percent of the acreage within that unit.

The entire WSA provides crucial habitat for species that are very sensitive to human intrusion, including elk, bear, and mountain lion. Elk can be found yearlong in the WSA. About 40 elk (105 AUMs) migrate into the area in the winter. Black bear and mountain lion can also be found yearlong, but are not abundant. Remote, isolated conditions greatly enhance habitat favorability for these species. There is no critical habitat in the WSA.

Upland game species within the WSA include mourning dove, chukar partridge (an introduced exotic species), blue grouse, sage grouse, ruffed grouse, and cottontail rabbits. Mourning dove are common in the WSA during the spring through fall seasons and may nest in pinyon-juniper trees.

Grouse are present in this WSA yearlong. Blue grouse and ruffed grouse can be found at the higher elevations in the Douglas fir and aspen vegetation communities and along riparian-sagebrush canyon bottoms. Sage grouse are found in sagebrush parks at higher elevations. Cottontail rabbits are found unitwide.

The lower portions of Westwater and Diamond Creeks are perennial streams that have potential for supporting a population of trout. Several species of nongame fish (dace, shiners, suckers, and killifish) are present. No game fish presently inhabit these streams.

Several species of reptiles and amphibians are present. The most common are short-horned lizard, whiptail lizard, northern tree lizard, side-blotched lizard, gopher snake, smooth green snake, striped whipsnake, and midget faded rattlesnake. Several species of amphibians such as red-spotted toad, northern leopard frog, and Utah tiger salamander could be present along the Diamond Creek drainage.

The most common birds found in the WSA are the red-tailed hawk, golden eagle, American kestrel, great horned owl, goshawk, Coopers' hawk, sharp-shinned hawk, blue jay, pinyon jay, swift, junco, kingbird, kinglet, nuthatch, magpie, raven, and various species of sparrows and swallows.

The WSA is favorable for wildlife because of its lack of human imprints. Several of the species present in the WSA are very sensitive to human intrusion, including black bear, mountain lion, and elk. Remote and isolated conditions greatly enhance habitat favorability for these species.

There are no transplants or habitat treatments planned specifically for wildlife although wildlife could benefit from the 106-acre burning and seeding project planned for livestock management.

Forest Resources

No forest production is known to have occurred within the WSA. Forested lands, which include pinyon-juniper and Douglas fir types, cover approximately 92 percent of the WSA. Adequate volumes for timber harvest are present and could produce limited amounts of pulp wood, saw timber, firewood, fenceposts, or Christmas trees. In all, the pinyon-juniper and Douglas fir trees could yield up to 7,289 cords of firewood. However, rugged terrain and steep slopes are prohibitive to production in most of the WSA, accessibility is very poor, and slow growth of trees and distance to possible mill sites are not favorable. More suitable stands are available elsewhere and

FLUME CANYON WSA

there is no commercial or noncommercial interest in forest products within the WSA. The forested area is considered nonproductive and noncommercial.

Livestock and Wild Horses/Burros

The Flume Canyon WSA contains portions of six grazing allotments. (Refer to Table 9 for data concerning livestock grazing within these allotments.) The Pear Park area of the WSA (13,100 acres) has had no livestock grazing privileges allocated since prior to the passage of FLPMA. Forage (722 AUMs) within the Pear Park area is being managed for wildlife under the Grand RMP.

Existing range improvements in the WSA are limited to several short-gap fences, generally across the drainages from rim to rim. The areas above and below these fences serve as livestock management units. The potential exists for land treatments (spraying, burning, or chaining and seeding) in wider canyon bottoms to remove overgrown sage, which would increase forage. Approximately 106 acres have been identified for burning and seeding. An increase of 13 livestock AUMs would result.

No wild horses or burros are known to inhabit the WSA.

Visual Resources

The WSA presents a landscape typical of the Book Cliffs. The steep slopes present sheer stone faces 10 to 50 feet high alternating with narrow ledges. Soils have formed on the ledges, supporting pinyon-juniper woodland communities. The alternating tan rock faces and dark-green vegetation give a striped appearance to the slopes that is noticeable some miles away. Toward the Roan Cliffs in the northern half of the WSA rock out-

crops shade to reddish-brown, as the name implies. Landforms are more dissected in the Roan Cliffs.

A visual resource inventory was done in 1977 (Ray Mann Associates, Inc., 1977). The entire WSA is classified as Class B scenery (scenery that combines some outstanding features with some fairly common to the physiographic region as a whole). The WSA contains all three measurable distance zones: about 31 percent (15,748 acres) is in the foreground-middleground zone visible from boundary roads, 58 percent (29,464 acres) in the background zone, and 11 percent (5,588 acres) in the seldom seen zone. The sensitivity level has been rated as high over about 17 percent of the WSA and medium over the remaining 83 percent, reflecting the relative degree of user interest and concern for changes in the landscape character. Based on these factors the WSA falls within VRM Classes II, III, and IV, covering 64 percent (32,500 acres), 31 percent (15,760 acres), and 5 percent (2,540 acres), respectively. Additional information on BLM's VRM rating system can be found in Appendix 7.

Cultural Resources

No cultural inventory has been made of the area, but two prehistoric sites (an Indian campsite and a pictograph) have been documented within the WSA. European influence in the region dates from Mexican traders and French fur trappers in the early 1800s. The trapper Antoine Robidoux left an inscription dated 1837 about 1 mile north of the eastern end of the WSA at the mouth of Westwater Creek Canyon. No existing or proposed National Register sites are in the WSA, although sites present may have potential. It is estimated that as many as 30 sites could occur in the WSA, with 15 of these having National Register potential.

TABLE 9
Livestock Grazing Use Data

Allotment	Class of Livestock	No. of Operators	Season of Use	Total Allot. AUMs	Total Allot. Acres	Acres of WSA	AUMs in WSA	Percent of Allotment
Corral Wash	Sheep	1	12/01-05/10	3,300	36,500	4,950	462	(14)
Sulphur Canyon	Sheep	1	11/12-04/12	1,961	28,800	6,850	470	(24)
Cisco Mesa	Sheep	1	12/01-04/30	3,180	63,100	3,700	190	(6)
Main Canyon	Cattle	1	07/01-09/30	450	16,000	7,700	216	(48)
Diamond	Cattle	1	05/10-11/10	588	20,50	10,900	311	(53)
West Water Point	Cattle	1	07/01-09/30	426	6,000	3,600	255	(60)
Totals		6		9,905	170,900	37,700 ¹	1,904	

Source: USDI, BLM, 1983.

¹Acreege does not include 13,100 acres in the Pear Park area.

FLUME CANYON WSA

Recreation

Recreational use of the WSA is low due to its remote nature and limited access. There is no evidence of hiking or camping use of the WSA away from roads and ways. The primary recreational use is for hunting. The WSA receives approximately 150 visitor days of hunting use annually permitted through two nonlocal commercial outfitters. The total recreational use, including hunter use, would be less than 350 visitor days annually. Due to the steep slopes and lack of roads within the WSA, hunters use four-wheel drive vehicles to travel on the road in the bottom of Diamond Canyon (and other trails and ways) and hunt the hillsides on foot or by horseback. UDWR has limited this area to four-point or larger mule deer buck only hunting and is currently considering the area for a quality hunting unit.

Possible recreational opportunities include hiking, backpacking, camping, cross-country skiing, horseback riding, sightseeing, hunting, and ORV use. Under the Grand RMP, the entire WSA is open to ORV use under 43 CFR 8340. About 9 miles of vehicular ways are accessed by ORVs (mainly hunters). These include 4.5 miles of ways in Long Canyon, a 1.5-mile abandoned way, and a 3-mile jeep trail to Westwater Point. Currently, recreational ORV use other than for hunting is essentially nonexistent due to the distance of the WSA from population centers and the presence of more attractive ORV use areas more accessible from population centers. In addition, the rugged terrain presents a natural barrier to ORV use.

Wilderness Values

SIZE

The WSA is 50,800 acres in size. It is roughly 14 miles east to west and 10 miles north to south at its widest points.

NATURALNESS

The human imprints within the WSA are not substantially noticeable within the WSA as a whole and are capable of being reclaimed naturally on all 50,800 acres. These imprints are as follows: (1) a vehicular way that runs approximately 3 miles to Westwater Point (pre-FLPMA); (2) approximately 4.5 miles of vehicular ways in Long Canyon; (3) an abandoned vehicular way 1.5 miles long; (4) two abandoned drill pads covering 5 acres each (pre-FLPMA); and (5) a rehabilitated road 3.5 miles long and a rehabilitated drill pad covering 5 acres.

Grazing has taken place on ridges and in canyon bottoms, but not on the steep sideslopes (approximately 25,000 acres). Mineral exploration has occurred in side canyons off Diamond and Westwater Canyons (approximately 800 acres). The remainder of the WSA (25,000 acres or 50 percent) could probably be considered untouched. The entire WSA meets the wilderness criterion for naturalness.

SOLITUDE

The WSA provides outstanding opportunities for solitude by virtue of its rugged topography and isolated nature. It is relatively large (50,800 acres), which enhances the opportunities present.

The rugged topography provides screening sufficient to obscure sights and sounds of others within the WSA. Vertical separation between ridgetops and canyon bottoms up to 1,000 feet enhance seclusion and feelings of isolation. This characteristic is more pronounced in the northwestern portion of the WSA.

The effectiveness of vegetation screening on steep slopes is diminished because of the wide bands of rock outcrop. Vegetation in high elevations (areas of Douglas fir forest) is more dense, enhancing screening possibilities. Areas of mountain shrubs provide dense thickets but screening potential varies with overall height of vegetation. Canyon bottoms vegetated with sagebrush generally do not provide cover from slopes and ridgetops above.

Sights and sounds from outside the WSA primarily involve oil and gas exploration around the WSA perimeter. Roads, pipelines, drilling activities, and pumping facilities for producing wells are a source of visual impacts, noise, and dust. From the southeast part of the WSA are views of drilling activities in the Cisco Desert (below the Book Cliffs) and of I-70. These are far enough from the WSA that they do not necessarily detract from solitude, and to some individuals would enhance the feelings of remoteness of the WSA. Vistas from within the WSA have not been documented, but there is good potential that vistas to the southeast from Diamond Ridge and other high points would be adequate to give a visitor the feeling of vastness.

The deeply incised, branching drainages within the WSA provide many travel routes which allow dispersion of recreational use.

It is possible to find secluded areas within the WSA because of the dissected topography, many possible routes of travel, the size of the unit, and the areas of forest cover.

FLUME CANYON WSA

In summary, the entire WSA (50,800 acres) meets the outstanding criterion for solitude, particularly because of the topographic and vegetation screening present.

PRIMITIVE AND UNCONFINED RECREATION

Outstanding opportunities for primitive-type recreation are present throughout the entire WSA. Although visitor use is currently low, the entire WSA provides opportunities for hunting, hiking, backpacking, camping, rock scrambling, etc. The many drainages and dissected terrain provide hundreds of potential hiking routes up canyon bottoms and along ridgetops. Steepness and height of sideslopes limit potential hiking routes into and out of canyons, but increase the challenge.

SPECIAL FEATURES

The WSA has supplemental ecologic, scenic, and archaeological values. The WSA provides habitat for big game animals that avoid areas of human occupation. Rock formations and color contrasts provide scenic value. The WSA is largely unexplored; it is probable that many scenic and archaeological features not mapped or named could be found by wilderness users.

Land Use Plans and Controls

There are six sections of State lands within the WSA (3,811.8 acres); all are under mineral lease (generally for oil, gas, hydrocarbons, and coal) but none are developed. Given the perceived mineral potential of the area, it is likely that these sections would be leased again upon lease expiration. The WSA is contiguous for about 2 miles with a 48,492-acre block of State land designated as a State roadless area, which has not been open to leasing or vehicle use since 1975. In addition to the large State roadless area, six individual State sections and about three sections of private land are adjacent to the WSA. There is no private land located inside the WSA. All State sections, in-held and adjacent to the WSA, are leased for grazing, with leases due to expire in 1990 or 1991. There are no private or split estate lands within the WSA.

There are no existing or pending rights-of-way within the WSA; however, development of pre- and post-FLPMA oil and gas leases could involve right-of-way applications for access roads or oil and gas pipelines. Normally, rights-of-way are not required for on-lease development.

The WSA is managed under multiple use by the BLM Grand Resource Area under the Grand RMP. The RMP acknowledges the wilderness review

but does not address wilderness designation or nondesignation of the WSA. The Grand RMP has been reviewed by the Governor of Utah and was found to be consistent with plans of the State of Utah.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) recognizes mineral potential in the Book Cliffs area but does not make any specific management directives. The WSA is not specifically mentioned in the plan. The plan generally emphasizes continuations of present uses and maximizing mineral development.

Socioeconomics

DEMOGRAPHICS

The WSA lies in north-central Grand County. The socioeconomic effects of designating or not designating the WSA as wilderness would be spread among communities in Grand County, Utah, with some effect on western Mesa County, Colorado.

Grand County can be characterized as rural and sparsely populated. The 1982 county population was 8,100 which is less than 1 percent of the State population of about 1.5 million (Brinkerhoff, 1983). The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab, and 32 percent lives in Spanish Valley, adjacent to and southeast of Moab. Grand County comprises about 3,615 square miles or about 4.5 percent of the State. About 80 percent of the county is owned by the Federal Government, 15.5 percent by the State, and 4.5 percent by private landowners.

Mesa County had a 1981 population of 87,100. The Grand Valley, which lies in the midwestern part of Mesa County, contains 83 percent of the county's population. Grand Junction (1980 population of 28,194) serves as a major service center for western Colorado and southeastern Utah (U.S. Department of Commerce [USDC], Bureau of the Census, 1981).

Access to the WSA currently is from I-70 by means of graded dirt County roads (Cottonwood Canyon and Hay Canyon roads). The WSA can be reached within 30 minutes to an hour from three Interstate exits. From the east Cisco exit it is about 20 miles via Diamond Canyon; from the Harley Dome exit it is about 20 miles via Westwater Creek Canyon; and from the Book Cliffs ranch exit it is about 25 miles via Westwater Creek

FLUME CANYON WSA

Canyon. Roads below the Book Cliffs are maintained for oil field operations; above the cliffline they are sometimes impassable during wet weather or heavy snow. The WSA can be accessed from other unimproved roads: Diamond Ridge road along the northern border, a jeep trail on the Book Cliff bench along the southern border, and the road up Dry Canyon through Pear Park on the northeast. These are generally impassable during wet weather.

The nearest communities are Thompson (population 200), about 30 miles southwest, and Cisco (population 45), about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado is about 40 miles east of the Harley Dome exit on I-70 and Green River and Moab, Utah are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

EMPLOYMENT

Recent statistics (refer to Table 10) show that 99 percent of local wage and salary employment is nonagricultural, with about 17 percent employed in Federal, State, and local governments. Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent mining and milling layoffs may have reduced the local importance of mining. Tourism directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export industries contributes to local income and employment. Including these multiplier effects, mining and tourism directly and indirectly accounts for 35 to 45 percent and 17 to 25 percent of local employment, respectively. Unemployment in the county is among the highest rates in the State with 1983 first quarter figures of approximately 18 percent (Utah Department of Employment Security, 1983). This is primarily due to large mine layoffs and the resulting downturn through the local economy.

Green River (population 1,048) in Emery County on the Grand County line is basically a tourism and farming community because of its location at the crossroads of U.S. Highway 6 & I-70. The mining and government sectors are also major employers in the area.

In Colorado, Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and

TABLE 10
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agricultural	1	1
Private Industry (Non-Agricultural)		
Mining	34	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10 ¹	8
Retail Trade	10 ¹	18
Finance, Insurance and Real Estate	3	2
Services	11 ¹	16
Other	—	—
Total Private Industry	85	82
Federal Government	5	7
State and Local Government	9	10
Total Government	14	17
Total Nonagricultural	99	99
Unemployment (1st Quarter, 1983)		18
	(Dollars)¹	(Jobs)
Total Employment and Earnings	\$52,753	3,617
Total Personal Income	\$75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

¹Includes 12 percent of total income due to tourism.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include wage, salary and proprietors' income. Employment percentage figures include only wage and salary employment. Relative importance of farm employment is, therefore, underrated. Tourism is included as part of Services, Retail Trade, and Other.

general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the recent decrease in oil shale activities, the local economy still shows some signs of growth.

INCOME AND REVENUES

Economic-related activities in the WSA include mineral exploration, livestock production, and recreation. Table 11 summarizes local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

The WSA has 237 mining claims that appear current in assessment work. Regulations require a \$100 annual expenditure per claim for labor and improvements, an undetermined part of which is spent in the local economy. Three oil and gas

TABLE 11
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	Less than \$23,700	None
Oil and Gas Leases	Unknown	Up to \$114,795
Livestock Grazing	\$38,080	\$2,666
Recreational Use	Less than \$1,435	\$150
Total	Less than \$63,215	Up to \$117,611

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

²Unknown or unavailable

wells have been drilled in the WSA over the past few years. This and the geophysical exploration that has been conducted in the WSA has generated some temporary local employment and income.

Six livestock operators have a total grazing privilege of 1,904 AUMs within the WSA. If all this forage were utilized, it would account for \$38,080 of livestock sales, of which \$9,520 would be ranchers' returns to labor and investment.

Woodland product harvest, if any, has been small and is insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use is low and associated with hunting. Related local expenditures are also low and could only be significant to the two commercial outfitters who currently use the WSA. The WSA's motorized recreational use and related local expenditures are also associated with hunting and are low. They are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced from Dalton (1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for the Flume Canyon WSA is estimated at about 350 visitor days per year. In addition, the two commercial outfitters would make approximately \$7,500 annually in sales based on the land-based commercial average of \$50.00 per user day. Only a portion of the expenditures for recreational use of the WSA contributes to the local economy of Grand County.

The WSA generates Federal revenues from mineral leases, livestock, and recreation sources (refer to Table 11).

Fifty leases in the WSA cover approximately 38,265 acres. At \$3 per acre, lease rental fees generate up to \$114,795 of Federal revenues annually. Half of these monies are allocated to the State, which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 1,904 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$2,666 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

Based on issuing an average of 150 user day (commercial) permits/year and an average permit fee of \$1.00/user day, recreation permits generate about \$150.00 of Federal revenues annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.

5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

The major changes that could occur in the area would be related to oil and gas and locatable mineral exploration and development. The area would be open to resource use and development without controls for wilderness protection. The degree of future development is unknown, but would probably be low due to the unit's rough terrain and limited resource potential. The following is a worst-case analysis based on the assumption that minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; and uranium/vanadium, 20 acres. Because oil shale and tar sand are not likely found within the WSA and because any coal within the WSA would be of very poor quality and would probably not be commercially recoverable, no surface disturbance from activities associated with these resources would be anticipated. (Appendix 10 lists mineral-related surface disturbance estimates and assumptions.) A burning and seeding project, designed to improve livestock forage, would cause temporary surface disturbance on 106 acres. The total disturbance in the WSA could, therefore, be up to 286 acres.

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Total disturbance of up to 286 acres would result in minor increases in fugitive dust emissions. Because no major sources of air pollutant emissions are proposed in the vicinity of the WSA, air quality would remain essentially as at present.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with development of oil and gas and uranium/vanadium would

probably not exceed 180 acres. Other types of mineral development would be unlikely. Because the disturbance would generally not involve the subsurface except for development of widely spaced wells and the acreage involved is small, no impact to the geologic structure of the area would be expected.

SOILS

It is estimated that up to 180 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present in the WSA is estimated at about 0.86 cubic yards/acre/year. If disturbed, the soil loss would increase to an average of 10.55 cubic yards/acre/year. Soil loss on the 180 disturbed acres would increase from 155 cubic yards/year to 1,899 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA would increase by approximately 1,744 cubic yards (4 percent) over the current annual soil loss of 43,434 cubic yards to approximately 45,178 cubic yards per year.

Soils would also be disturbed from rangeland developments. The 106 acres of land treatments would be designed to improve ground cover and forage and soil conditions. Ground cover would be disturbed during the early implementation stages, increasing erosion during the short term. BLM experience in the affected area indicates that the plant density existing before disturbance would be achieved or increased in about 4 years (USDI, BLM, 1982b).

The opportunity to dry farm up to 160 acres of the WSA would be available under this alternative. There is, however, no current plan and questionable potential to use any of these lands for agricultural purposes.

VEGETATION

No major changes in vegetation types would be expected from potential disturbances of 286 acres, less than 1 percent of the WSA. Disturbance in the form of roads and drill pads could, however, alter the composition of the riparian-sagebrush community (5 percent of the WSA) if development occurred there. No threatened, endangered, or sensitive plant species occur within the WSA.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance occurs, increased

sediment yield can affect water quality. Surface disturbance from mineral and energy exploration and development could impact 180 acres under this alternative, with a soil loss increase of approximately 1,744 cubic yards per year. Sediment yield in streams could increase in proportion to the erosion increase. However, instream drop structures and other watershed treatments on Diamond and Westwater Creeks could be developed under this alternative to minimize downstream damages from flooding and erosion. This would reduce sediment yield and offset any increase in sediment due to surface disturbance. There would be little, if any, change in ground water quality resulting from 180 acres of mineral-related surface disturbance. The 106 acres of land treatment could increase sediment in streams for a short period of time. However, successful reclamation would reduce sediment yield to below pretreatment levels.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Oil and gas categories in the WSA would remain the same (2,000 acres in Category 1 [standard stipulations] and 48,800 acres in Category 2 [standard and special stipulations]). The wilderness stipulations on post-FLPMA leases would be lifted. There would be 12,535 acres currently unleased that would be available for leasing.

The WSA is considered to have relatively small, widely scattered oil and gas pools, anticipated to contain less than 10 million barrels of oil or less than 60 billion cubic feet of natural gas. Of this, less than 18 billion cubic feet of gas or 3 million barrels of oil are estimated as recoverable. These oil and gas resources could be explored and developed without concern for wilderness values. However, due to the small size of these potential deposits as well as the restrictive terrain, significant production is not expected under this alternative.

Tar Sand and Oil Shale

Tar sand exploration and development could occur under this alternative if the area were opened to hydrocarbon leasing in the future. According to SAI (1982), the potential exists for less than 10 million barrels of oil in-place (3 million recoverable). However, field data indicate that there is no tar sand in Flume Canyon WSA due to the absence of geologic formations that contain these deposits, even though about 1,450 acres of the WSA are in the P.R. Spring STSA. Therefore, although the area would be open to tar sand development, none would likely occur.

The northern portion of the WSA (20,480 acres) is in an oil shale withdrawal that was created in the 1930s. Presently, no oil shale has been leased within the WSA. According to SAI (1982), the potential exists for thin beds of oil shale that would yield less than 15 gallons per ton of shale. However, field data indicate that there is no oil shale in the Flume Canyon WSA due to the absence of geologic formations that contain such deposits. Therefore, although the area could be available for oil shale development under this alternative, none would likely occur.

Coal

Under this alternative, the area could be made available for coal leasing, and exploration and development could occur. There is a high probability that low amounts of low quality coal underlie the WSA (7 to 13 million tons considered recoverable). However, production is not likely due to the very poor quality and low amounts of coal.

Locatable Minerals

Under this alternative, locatable mineral development could occur within the WSA. The WSA would remain open to mining claim location and new claims could be filed with the exception of the area covered by the oil shale withdrawal, which would remain closed to mineral location. About 4,320 acres on the Book Cliffs bench are currently covered with placer claims, with another 420 acres in the WSA covered with 237 uranium claims. The potential deposit of less than 500 tons of uranium oxide could be developed under this alternative. It is unlikely that production would ever occur due to the depth of the deposit and the availability of the resource with better access elsewhere. It is unlikely that the WSA contains minable silver or gold deposits so production is unlikely for these resources as well.

WILDLIFE

The WSA provides crucial habitat for species sensitive to disturbance including elk, bear, and mountain lion. These species would be adversely impacted in the short term by surface disturbance from mineral exploration and production. As much as 180 acres of surface disturbance could occur from mineral and energy exploration and development under this alternative. Generally, this disturbance (less than 1 percent of the WSA) would result in negligible effects to wildlife. This disturbance would, however, reduce crucial elk, bear, and mountain lion habitats during disturbance. Reclamation could result in habitat improvement over the long term. Mobile animals including elk, bear, mountain lion, and deer would leave the area of disturbance, and less

mobile animal populations would be reduced during the time of disturbance. Populations might or might not return after activities ceased. Existing oil and gas leasing categories provide special stipulations to protect certain wildlife species and their range. It is assumed that similar stipulations would be developed for coal leasing if lands were made available for this type of lease.

The entire Book Cliffs range in east-central Utah provides similar habitat, but habitat is limited over southeastern Utah to areas of higher elevation. Most of the east Book Cliffs area is now subject to some development pressure that could eventually result in loss of bear, mountain lion, and elk habitat.

The potential vegetation treatment of burning and seeding on 106 acres could occur under this alternative, which would reduce forage competition between livestock and big game. Wildlife transplants or additional developments to improve wildlife habitat could be allowed in the future, although none are currently planned.

Prior to any disturbance, BLM would initiate Section 7 consultation with the Fish and Wildlife Service (FWS) concerning the endangered black-footed ferret or any other threatened, endangered, or candidate species that could occur in the WSA, as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these species, it can be reasonably concluded that the population viability in the WSA would be preserved under the No Action Alternative. There are no Federally designated critical habitats that could be affected.

FOREST RESOURCES

Harvest of the woodland products in this WSA (including up to 7,289 cords of firewood) would be allowed under this alternative, but use probably would not exceed low levels due to limitations on resource potential, topographic restraints on access, and availability of the resource elsewhere. As much as 180 acres of potential disturbance are expected from mineral exploration and development and 106 acres of pinyon-juniper loss would occur with the planning vegetation manipulation. Because trees would not be harvested in either case, no significant loss of producible products would result. There would be no change in forest management or resource production under this alternative.

LIVESTOCK

Few, if any, changes in livestock use or management techniques are expected under this alterna-

tive. Domestic livestock grazing would continue as authorized (currently 1,904 AUMs involving six permittees) in the Grand RMP. Existing range developments (short-gap fences) could be used and maintained as in the past. Additional roads or livestock developments could be allowed in the future without regard for wilderness values. Currently planned projects that could be completed under this alternative include land treatments on 106 acres. The land treatment would eventually result in 13 additional AUMs and would allow for better livestock distribution in the WSA. The possible 180-acre disturbance from oil and gas and uranium/vanadium exploration and development would not reduce livestock forage significantly because it would involve less than 1 percent of the area.

VISUAL RESOURCES

Under this alternative, visual quality in the WSA would be protected by limitations placed on potential surface-disturbing activities (i.e., 32,500 acres would be managed under VRM Class II objectives requiring that activities not be apparent).

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 180 acres of surface disturbance from oil, gas, or uranium activities would be degraded, and VRM Class II management objectives would probably not be met in disturbed areas during the short term. After rehabilitation, visual resources would be restored to meet VRM objectives. Even after mitigation and rehabilitation, some permanent localized degradation could result from energy-related exploration and development. The probability, however, of extensive energy and mineral exploration and development is low. Rangeland developments, including the 106 acres of proposed land treatment, would also reduce visual quality in the affected areas, although the development would be designed to meet VRM objectives as much as possible.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 180 acres of surface disturbance by mineral exploration and development and 106 acres of surface disturbance from land treatments under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance and would lessen impacts. However, some of 30 potential cultural sites (as many as half of which could have National Register potential) could be in the disturbed areas and could be inadvertently

destroyed. Vandalism of sites would be expected to increase in proportion to the general population increase, as well as to any increase in roads from mineral and energy exploration and development. The overall effect on cultural resources is unknown because the exact locations of the potential surface disturbances are not known.

RECREATION

Primitive recreational opportunities and quality would be diminished on the 180 acres disturbed by mineral and energy activities and the 106 acres that would be disturbed by land treatments. Roads and ways created from mineral exploration and development would improve access into the area for nonprimitive recreation. Approximately 9 miles of existing vehicular ways presently open to vehicular access, as well as new access roads and ways from energy exploration, would provide vehicular access for nonprimitive recreational uses. Motorized activities would be allowed in the entire WSA although use is largely limited by the area's steep terrain.

The future increase in recreational use of the WSA is unknown. However, based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981), it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreational use is expected to increase from the estimated 350 current visitor days per year to about 522 visitor days at the end of 20 years.

While nonprimitive recreation use such as hunting would increase due to improved access, the quality of the hunting experience could be reduced if animal numbers were lower due to loss of habitat from mineral-related disturbance.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the Grand Resource Area RMP. Mineral and energy exploration and development could disturb an estimated 180 acres. Naturalness values (50,800 acres) now existing could be affected by this disturbance. Mineral-related actions, (e.g., benching roads and drill pads on steep, rocky slopes) could cause permanent imprints. If roads and drill pads are located throughout the WSA, the related surface disturbance would result in a significant loss of naturalness and outstanding opportunities for primitive and unconfined recreation throughout the area as a whole. In addition, the 106-acre vegetation treatment would result in loss of wilderness values on the affected area.

Outstanding opportunities for solitude and primitive recreation could be lost or reduced by the sights and sounds of mineral operations and use of vehicles within the area.

Special features of ecosystem variation, scenic qualities, cultural resources, and sensitive wildlife habitat could also be reduced due to mineral-related surface disturbance.

LAND USE PLANS AND CONTROLS

Nondesignation would be consistent with the Grand County goal of continued multiple use and maximizing mineral production. This alternative is based on the proposed Grand Resource Area RMP and is, therefore, in conformance with it. The RMP has been reviewed by the Governor and has been found to be consistent with the plans of the State of Utah. The No Action Alternative would also be consistent with the State of Utah policy of emphasizing economic return from State school lands.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the oil, gas, and uranium/vanadium in the WSA were developed, it would lead to increased employment and income for Grand County. However, the probability of economic development of minerals within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no livestock-related economic losses because the existing grazing use (1,904 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed vegetation treatment that would produce 13 AUMs of new allocated forage could lead to \$260 of livestock sales, including \$65 of ranchers' returns to labor and investment.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase to only 522 visitor days per year at the end of 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced

by this alternative. There are 12,535 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to \$37,605 additional Federal lease fee revenues per year in addition to new royalties from lease production and bonus bids from new leases in KGSSs. Half of these monies would be allocated to the State, a portion of which could reach the local economy. Collection of livestock grazing fees (\$2,666 per year) would continue. The additional 13 AUMs of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by about \$18 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (50,800 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 50,800-acre area would be related to its withdrawal from mineral location and closure to new mineral leasing and sale. The entire area would be placed in leasing Category 4 (closed to leasing). About 50,800 acres would also be closed to ORV use, except for approvals by BLM. The WSA would be managed under VRM Class I.

For the following analysis it is assumed that the existing uranium mining claims would eventually be explored and developed, causing an estimated 20 acres of disturbance within the WSA. It is also assumed that, except for unitized leases or leases held by production outside the WSA, existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases that lapse would not be renewed and future leasing of oil and gas, as well as any other mineral resource lease, would not be allowed. Unitized or developing leases on approximately 28,400 acres could be developed inside the wilderness. Disturbance from development could be as much as 119 acres. Therefore, total disturbance under the alternative could be as much as 139 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.) The 106-acre proposed burning and seeding project would not be allowed.

Because potentially disturbed areas would be smaller than under the No Action Alternative (139 vs. 286 acres), the impacts from development and surface disturbance on air quality, geology, soils, water, vegetation, livestock, forest, and wildlife resources for the All Wilderness Alternative would be less than the generally insignificant

impacts as described for the No Action Alternative. Wilderness designation would provide additional protection to these resource due to reduction in potential surface disturbance. Other effects on these resources due to changes in management are discussed below.

SOILS

Overall, the soil resource would benefit under the All Wilderness Alternative because mineral-related surface-disturbing activities are not expected to exceed 139 acres. The average rate of soil loss at present is estimated to be about 0.86 cubic yard/acre/year. If disturbed, the soil loss would average 10.55 cubic yards/acre/year. Soil loss on the 139 disturbed acres would increase from 120 cubic yards/year to 1,466 cubic yards/year. This is 433 cubic yards per year less soil loss than under the No Action Alternative. The 106 acres of land treatment would not occur under this alternative; therefore, increased erosion during the short term and less erosion over the long term from such treatment would not occur under this alternative.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance occurs, increased sediment yield can affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 20 acres under this alternative. Because of the minimal area affected, there would be no significant change in water quality from the current situation. The development of watershed treatments, including the planned instream drop structures in Diamond and Westwater Creeks, likely would not be allowed unless designed to blend with the wilderness environment, constructed of natural materials, and placed by hand methods. Damage from flooding would continue to occur. The ground water resource in the WSA would not be affected as a result of implementing the All Wilderness Alternative.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Wilderness designation would result in closure of the area to future oil and gas leasing. Existing pre- and post-FLPMA leases (29,110 acres and 8,755 acres, respectively) plus 400 unitized acres could be developed subject to the stipulations issued at the time of leasing. Leases on at least 28,000 acres plus the unitized acreage could continue to be held by production outside the WSA and could

FLUME CANYON WSA

eventually be developed inside the WSA. It is unlikely that the other existing leases would be developed or a showing of commercial quantities made prior to their expiration dates, and expired leases would not be reissued. Assuming that the oil and gas resource is found equally throughout the WSA, exploration for and development of a potentially recoverable resource of less than 1.3 million barrels of oil or less than 7.9 billion cubic feet of natural gas would be foregone under this alternative. However, due to the small size of the potential deposits and the terrain restrictions, it is unlikely that production would occur from the area even without wilderness designation. Therefore, this alternative would not result in any significant loss of potential oil and gas recovery.

Tar Sand and Oil Shale

The opportunity for leasing and recovery of tar sand and oil shale from the WSA would be foregone under this alternative. However, field data indicate that there is no potential for either resource within the WSA; therefore, development would likely not occur even without wilderness designation.

Coal

There is a high probability that low amounts of poor quality coal underlie the WSA. No leases for this resource exist and none would be issued under this alternative. Thus, the potential for the development of 7 to 13 million tons of recoverable coal would be foregone. However, due to the low amounts and poor quality of the coal within the WSA, production would be unlikely even without wilderness designation.

Locatable Minerals

The area would be withdrawn from mining claim location. Potential exists for a deposit of less than 500 tons of uranium oxide and vanadium (considered a strategic and critical mineral). It is unlikely that any recoverable gold or silver occurs in the area.

About 4,320 acres on the Book Cliff bench are covered with placer claims, with another 420 acres in the WSA covered with uranium claims. Development work, extraction, and patenting would be allowed to continue on valid mining claims after wilderness designation under unnecessary or undue degradation guidelines. If minerals are located prior to wilderness designation, it is estimated that up to 20 acres could be disturbed due to exploration and development of the locatable mineral resources. The worst-case impact to locatable minerals would occur if the recoverable resource is not within mining claims filed prior to

designation. In that case the potential for recovery of less than 500 tons of uranium and vanadium would be foregone.

WILDLIFE

Overall, wildlife would benefit from the reduction of potential mineral-related surface disturbance (from 180 acres under the No Action Alternative to 139 acres under the All Wilderness Alternative) and from preservation of solitude. Habitat for the black-footed ferret (endangered), any candidate species that may be in the WSA, and crucial habitats for elk, black bear, and mountain lion would receive additional protection from surface disturbance under this alternative. Prior to any mineral development BLM would conduct site-specific clearances of potentially disturbed areas. If black-footed ferret or any of the candidate species possibly located in the area could be affected, BLM would initiate Section 7 consultation with FWS as required by the Endangered Species Act and BLM policy. BLM would request a biological opinion when appropriate (refer to Appendix 4). Because necessary measures would be taken to protect these animals, it can be reasonably concluded that the viability of populations of any endangered animal species would be preserved under the All Wilderness Alternative.

Potential wildlife transplants would be allowed, although none are currently planned. The 106-acre land treatment that would result in improved water and forage and less competition with livestock would be foregone under this alternative. However, the overall effect of wilderness designation would be beneficial due to the preservation of solitude and habitat.

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Grand Resource Area RMP. The 1,904 AUMs currently allocated in the WSA would remain available for livestock.

Existing short-gap fences would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. None are currently planned. Future roads or other livestock handling facilities could be prohibited to preserve wilderness values. The potential vegetation burning and seeding project with 13 additional AUMs of forage production would not be allowed. However, because very little use of motorized vehicles is currently taking place to manage livestock, little effect on livestock grazing is expected.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative the potential for surface-disturbing activities that could reduce visual quality would be reduced through management under VRM Class I (which generally allows for only natural ecological change), through closure of the entire area to ORV use, and through closure of the entire area to future mineral leasing and location.

Potential mineral-related disturbance would be reduced from 180 acres to 139 acres. Although mitigating measures would be applied to reduce visual contrast created by mineral-related disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. Because the potential for development of mining claims is low and wilderness designation would reduce the potential for surface disturbance, visual quality would probably not be reduced in the WSA as a whole.

The disturbance from 106 acres of planned vegetation manipulation and disturbance would not occur, thereby further preserving the area's visual resource.

CULTURAL RESOURCES

Wilderness designation would benefit cultural resources by limiting the amount of surface-disturbing activity (especially additional roads) and by restricting motorized access. There is a potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities.

RECREATION

This alternative would benefit primitive recreation opportunities by reducing the likelihood of surface-disturbing activities of mineral exploration and development and increasing management attention and recognition to recreational values. Hunting opportunities would benefit because crucial habitats for animals sensitive to human intrusion (including elk, bear, and mountain lion) would receive more protection from surface-disturbing activities. Although hunting access would be limited to foot or horseback methods, the quality of the hunting experience would be maintained.

The entire 50,800 acres (including about 9 miles of vehicular ways) would be closed to ORV recreational use. This would not be a significant loss of ORV opportunity because this activity is presently nonexistent within the WSA.

Mineral-related surface disturbance on up to 139 acres could cause localized reduction in recreational values in the WSA, especially if disturbance occurred in the form of roads and drill pads. With only 139 acres of surface disturbance, primitive recreation values would likely be preserved in the area as a whole.

As discussed for the No Action Alternative, recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an undetermined increase in primitive recreational use above the baseline rate. Judging from use densities of a number of well known wilderness areas and primitive areas in the region, the WSA's site characteristics, the population distribution about the WSA, and the availability of similar sites, it is estimated that use after designation could be as much as 5,080 visitor days per year. This is an increase of 4,730 visitor days (1,451 percent) over the area's current annual visitor use. Management provided through a Wilderness Management Plan would attempt to control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. Commercial hunting operations would benefit. As recreation use increased, other commercial operations based on primitive recreational activities could apply for use of the WSA.

WILDERNESS VALUES

Wilderness designation and management would contribute to the preservation of the area's wilderness values. The WSA contains 50,800 acres of naturalness, outstanding solitude, and outstanding primitive and unconfined recreation values. The special features in the WSA (i.e., ecologic, scenic, and cultural) would also be protected.

The potential exists for 139 acres of surface disturbance to occur from mineral and energy exploration and development. No disturbance from potential rangeland developments is anticipated. Wilderness values within or near the acreage disturbed could be lost or reduced. If roads are located throughout the WSA, wilderness values could be lost in the area as a whole, although this

is somewhat less likely than under the No Action Alternative due to less potential disturbance. The potential for oil and gas development is probably low due to the low amount of resource and the area's rough terrain.

The WSA is adjacent to two other BLM WSAs and a State roadless area. The recreational values of horsepacking, backpacking, hunting, and related pursuits would be enhanced by the creation of a large block of wilderness.

Recreational use of the WSA could be as much as 5,080 annual visitor days after wilderness designation (which is a 1,451-percent increase over the current estimated 350 annual visitor days). This increase in use would probably not decrease opportunities for solitude and primitive recreation because of the large size of the WSA. Also, the management plan for the area would focus on dispersed use opportunities.

LAND USE PLANS AND CONTROLS

Protecting watersheds and minimizing new road construction would be consistent with management of the adjacent State roadless area. Wilderness designation would be generally consistent with the *Grand County Master Plan* because most resource uses would be allowed, although under more restrictive conditions. Designation would not be consistent with Grand County's stated policy of maximizing mineral development. If State land (six sections) within the WSA is exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. The Grand RMP does not provide for wilderness designation. Wilderness designation of the WSA would be an amendment to the RMP.

SOCIOECONOMICS

Overall, there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11), as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide) and would

only be significant to the two commercial outfitters now using the WSA and those that may begin to use the WSA.

Motorized recreational use of the WSA is light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

Hunter pressure on the South Book Cliffs deer herd unit and related local expenditures should increase slightly. Recreation expenditures from the designated wilderness could be significant to commercial outfitters. Two outfitters have made commercial hunting use of the WSA and the adjoining WSA in the past. With designation, they could probably charge more per trip. It is also probable that additional outfitters would use the area if it were designated wilderness, both for hunting and other primitive recreational uses.

Expenditures associated with recreation (average of \$4.10 per visitor day) in the WSA would be well distributed among businesses in Green River and Moab, Utah with some spillover into western Mesa County, Colorado. However, the resulting local expenditures would be regionally insignificant. Other than to commercial outfitters, recreation expenditures would also be locally insignificant to any single business in the affected area.

The potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low, it is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

The worst-case implication is that 20 jobs in oil and gas activities would be foregone with designation. There are numerous existing leases in the vicinity that could still be developed with designation; therefore, the potential loss of local employment would probably be insignificant.

Although some of the potential labor requirements would come from workers temporarily moving into the area, the majority of workers would be hired from Green River and Moab, Utah

FLUME CANYON WSA

and eastern Mesa County, Colorado. Many oil and gas field services would be provided by local businesses, and some of the wages earned by the oil and gas workers would circulate through the local economy. Exploration and development of an area's oil and gas resources is the most labor intensive phase of oil and gas production, but is of relatively short duration.

Designation would have little impact on the development of other hydrocarbon or coal resources. With the WSA's potential for tar sand and oil shale highly unlikely, wilderness designation should have little effect on development of these resources. The local employment opportunity and economic benefits resulting from development of these resources are unknown but probably low even without wilderness designation.

Livestock use and ranchers' income would continue as at present with \$38,080 of livestock sales, including \$9,520 of ranchers' return to labor and investment. The 106-acre proposed vegetation treatment for livestock would be foregone along with any resulting increase in ranchers' income. If this project were to be implemented and the additional forage used, ranchers' returns to labor and investment would increase by \$65 and livestock sales would increase by \$260.

If the proposed range improvement is not developed and used, an estimated annual \$18 of Federal grazing revenues from 13 increased AUMs would be foregone.

Wilderness designation would eliminate the potential for woodland product harvesting and related Federal revenues. There is no present harvest from the WSA.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues could increase if the demand for commercial outfitter services increases. There are presently two commercial outfitters using the WSA, and designation could lead to more commercial recreational use in the WSA.

The loss of 9,865 acres now leased for oil and gas but not held by production or unitization would cause an eventual loss of up to \$29,595 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$37,605 annually in Federal revenues from the 12,535 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production and bonus bid revenues from new leases in KGS areas could also be foregone.

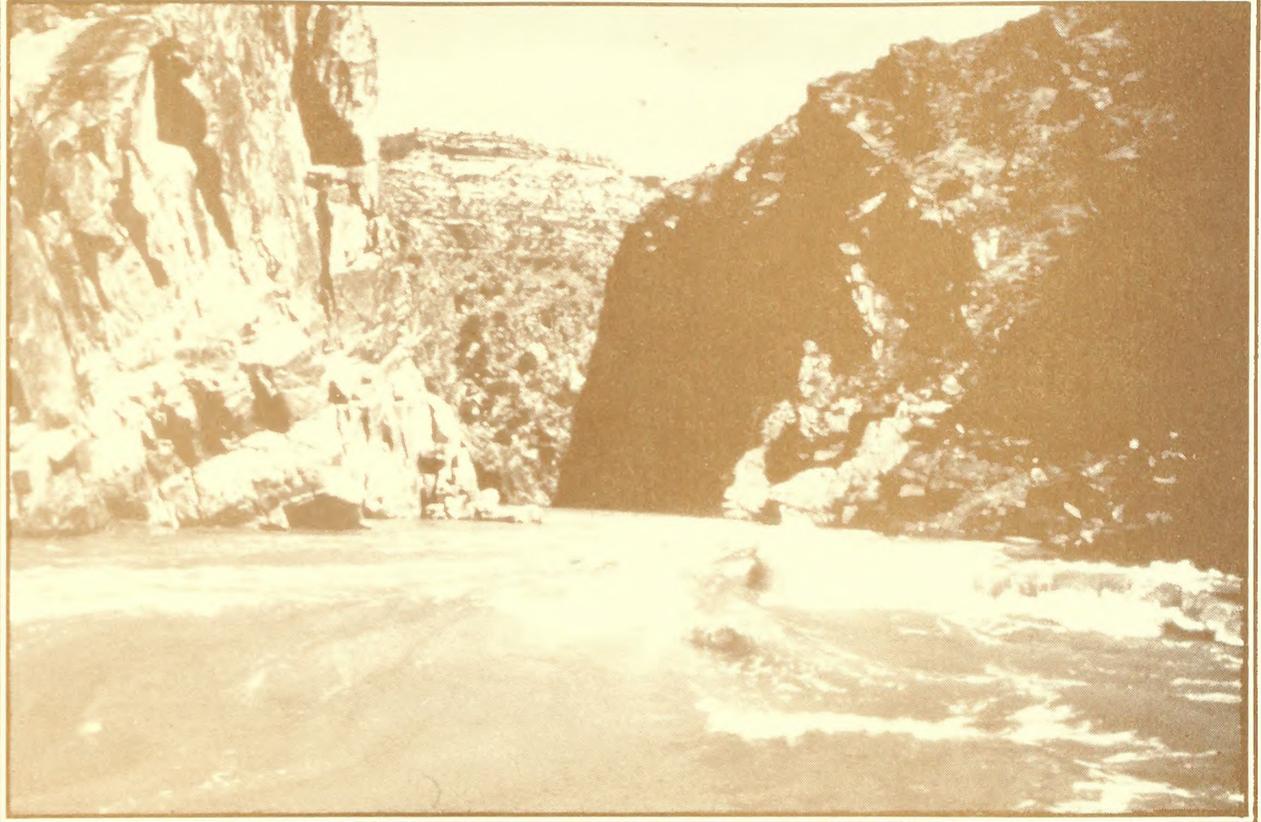
BIBLIOGRAPHY

- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Harley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Ray Mann Associates, Inc. 1977. "Visual Resource Inventory and Evaluation of Central and Southern Coal and Range Regions of Utah." Cambridge, Massachusetts.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists*. 1981 Field Conference. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. Salt Lake City, Utah.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1971. *Wild Horse and Burro Act*. Public Law 92195. December 15, 1971. Washington Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Price District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Lands Under Wilderness Review*. December 12, 1979. U.S.

FLUME CANYON WSA

- Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Uintah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Proposed Management Plan and Final Environmental Impact Statement*. December 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). March 1, 1985. Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- U.S. Department of the Interior, National Park Service. 1982. *The Nationwide Rivers Inventory*. January 1982. U.S. Government Printing Office, Washington D.C.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in Cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Recreation Plan, 1980 SCORP*. Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Westwater Canyon WSA



WESTWATER CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative	2
All Wilderness Alternative	4
Partial Wilderness Alternative (Proposed Action)	7
Summary of Environmental Consequences	10
AFFECTED ENVIRONMENT	10
Air Quality	10
Geology	10
Soils	10
Vegetation	13
Water Resources	14
Mineral and Energy Resources	14
Wildlife	17
Forest Resources	17
Livestock and Wild Horses/Burros	18
Visual Resources	18
Cultural Resources	19
Recreation	19
Wilderness Values	20
Land Use Plans and Controls	22
Socioeconomics	23
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	25
Analysis Assumptions and Guidelines for All Alternatives	25
No Action Alternative	25
All Wilderness Alternative	28
Partial Wilderness Alternative (Proposed Action)	31
BIBLIOGRAPHY	35

WESTWATER CANYON WSA (UT-060-118)

INTRODUCTION

General Description of the Area

Westwater Canyon Wilderness Study Area (WSA) lies just west of the Utah-Colorado State line in east-central Grand County, Utah. It spans the Colorado River with the eastern two-thirds of the WSA located in the Dolores Triangle (the area bordered by the Colorado River, Dolores River, and the Colorado-Utah State line). The WSA is about 8 miles across both north-south and east-west. It contains BLM-administered lands plus portions of the surveyed bed of the Colorado River managed by BLM for a total of approximately 31,160 acres. In addition, 1,120 acres of State land in two tracts are located within the WSA. (The *BLM Intensive Wilderness Inventory* [USDI, BLM, 1980] indicated the WSA contained approximately 30,800 acres. The difference in acreage figures is attributable to Master Title Plat checks and a minor realignment of the northwestern boundary due to mapping error.) The WSA is located in BLM's Moab District and is administered by the Grand Resource Area.

Although it is located only 7 miles southeast of Interstate 70 (I-70), the WSA is difficult to reach. The nearest community is Cisco (population is less than 50) which lies about 5 miles to the west of the WSA. The nearest towns of any significant size are Grand Junction, Colorado, about 25 miles east, and Moab, Utah, about 30 miles southwest of the WSA.

The WSA has a semiarid climate characterized by very hot summers and moderately cold winters. Annual temperatures range from 120 degrees Fahrenheit (F) to 10 degrees F. The approximate average annual precipitation is 7 to 10 inches, mostly occurring as late summer thunderstorms. Annual snowfall averages 20 to 40 inches.

The principal feature of the WSA is the highly scenic Westwater Canyon of the Colorado River, famous for its whitewater rapids and river running opportunities. The river within the WSA is being studied and recommended for inclusion in the Wild and Scenic Rivers System. The final decision by Congress is pending. The remainder of the WSA consists of rolling tablelands, cut by deep side canyon systems in the southeastern portion. Elevation ranges from 4,100 feet to 6,500 feet above sea level. The WSA is dominated by pinyon, juniper, sagebrush, blackbrush, and riparian vegetation.

Specific Issues Identified in Scoping

General issues pertaining to the WSAs in the Grand Resource Area are discussed in Volume I. Four specific issues pertaining to the Westwater Canyon WSA were identified through formal public scoping (USDI, BLM, 1984) and are responded to below:

1. *Comment:* This WSA is a significant source of sediment to the Colorado River system, and control activities should be allowed.

Response: It is recognized that sediment and salinity are problems common to the Colorado River. However, it is important to note that studies have not shown the area encompassed by the WSA to contribute more sediment or salinity to the Colorado River than any other area in Utah. Under wilderness designation, new water resource facilities or watershed activities would be allowed only if they would enhance wilderness values, correct conditions presenting eminent hazards to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S., 1964). Impoundments, pumping facilities, or diversion structures on the Colorado River in the WSA would not be allowed and none have been planned.

2. *Comment:* The area has high wilderness values, particularly those associated with opportunities for river-related recreation, and has been recommended for Wild and Scenic River status, which favors its designation as wilderness.

Response: The wilderness values related to river recreation and Wild and Scenic River status are discussed under the Affected Environment, Recreation and Wilderness Values sections of this document. Analysis does show that wilderness designation would provide additional protection to these values.



3. *Comment:* The recommendation (Partial Wilderness Alternative) was based on "manageability" but no rationale was offered. What is not manageable? Likewise, there was exclusion of one unit (130A) because it would be impacted by sights and sounds from Picture Gallery Ranch. What sights and sounds?

Response: During scoping for this Environmental Impact Statement (EIS), BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982a) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS. The Partial Wilderness Alternative included those acres having outstanding opportunities for solitude and primitive, unconfined recreation. The boundary near Picture Gallery Ranch was relocated from the flat land adjacent to the ranch to a cliff face. The flat land has potential for agriculture development. Unit 130A was eliminated from further study during the intensive inventory, and thus, is not a part of the wilderness study phase or EIS analysis. The sights and sounds would be those associated with normal ranching and farming activities.

4. *Comment:* The oil and gas (mineral) potential of the WSA is ranked none by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of the WSA to be moderate. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies. The SAI (1982) report will be used as the ref-

erence on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (31,160 acres); and (3) Partial Wilderness (26,000 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE

Under this alternative, none of the 31,160-acre Westwater Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Grand Resource Area Resource Management Plan (RMP) (USDI, BLM, 1983) and subsequent BLM multiple-use planning activities. The 1,120 acres of State land within the WSA (refer to Map 1) has not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership. No private or split estate lands are located in the WSA.

The following are specific actions that would be taken under this alternative:

- All 31,160 acres would remain open to mineral location with the exception of a temporary withdrawal (4,160 acres) along the Colorado River associated with Wild and Scenic River studies. This withdrawal will be lifted on April 25, 1988 or earlier if Congress acts prior to that date and decides not to give Wild and Scenic River status to that portion of the Colorado River in West-

WESTWATER CANYON WSA

Map 1

LAND STATUS

Westwater Canyon WSA

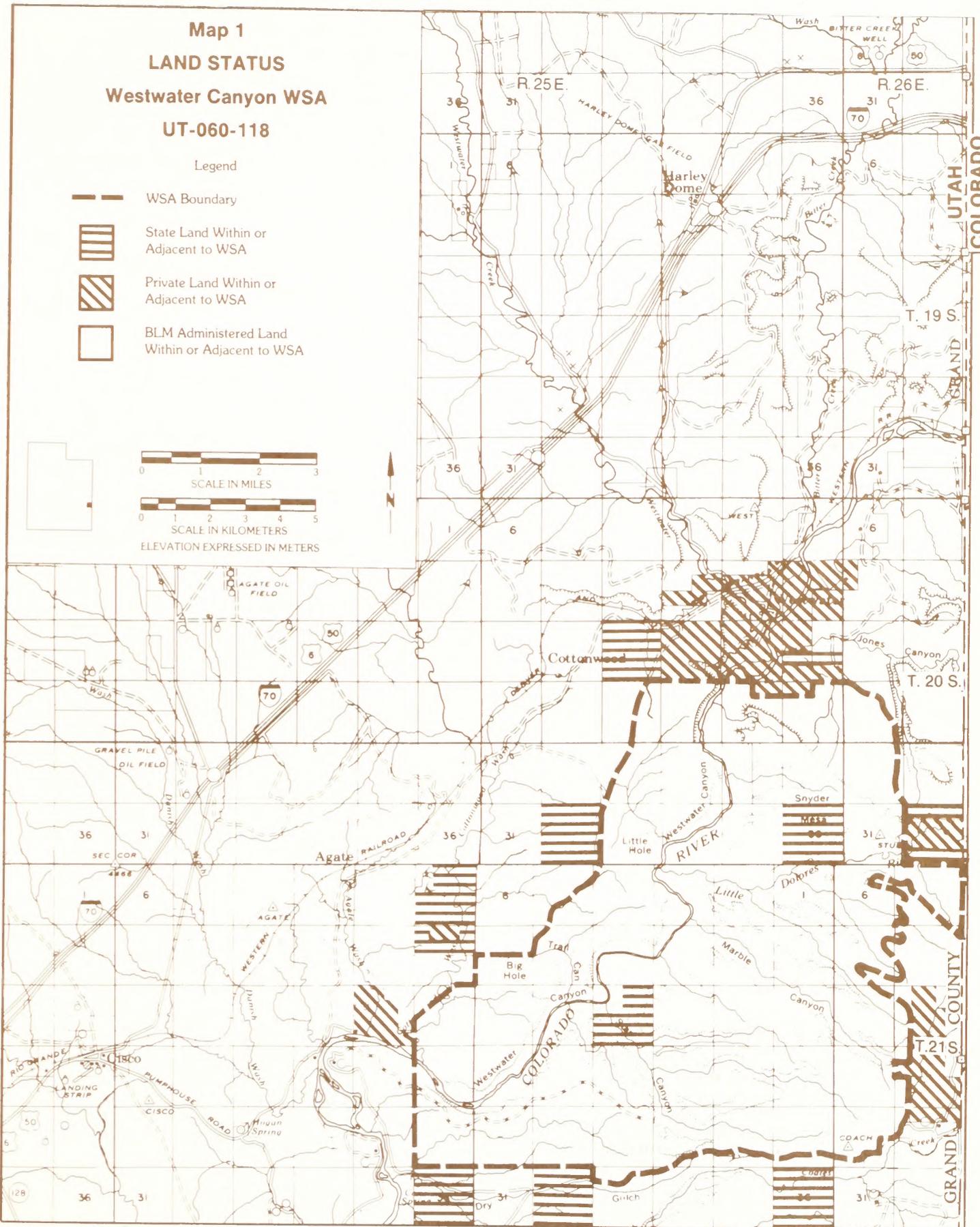
UT-060-118

Legend

-  WSA Boundary
-  State Land Within or Adjacent to WSA
-  Private Land Within or Adjacent to WSA
-  BLM Administered Land Within or Adjacent to WSA



ELEVATION EXPRESSED IN METERS



WESTWATER CANYON WSA

water Canyon. Wild and Scenic River status would continue the withdrawal. Development of existing mining claims (1,805 acres) and any future claims would be regulated by unnecessary or undue degradation regulations (43 Code of Federal Regulations [CFR] 3809). The WSA would also remain open to mineral leasing and sale. Existing oil and gas leases (480 acres) could be developed under leasing Category 1 (standard stipulations). The entire WSA would be managed under the following oil and gas leasing categories: Category 1 (standard stipulations) on 15,546 acres; Category 2 (standard and special stipulations) on 820 acres; Category 3 (no surface occupancy) on 14,043 acres; and Category 4 (no leasing) on 751 acres.

- The present domestic livestock grazing use of the 31,160-acre area of the WSA would continue as authorized in the RMP (545 Animal Unit Months [AUMs]). Existing range developments (three reservoirs and several short-gap fences) could be maintained by mechanical methods. New range developments could be implemented without wilderness considerations. A proposed 500-acre burning-and-seeding project has been identified.
- Developments for wildlife, water resources, etc., would be allowed without concern for wilderness values if in conformance with the Grand Resource Area RMP and subsequent BLM planning documents. None are now proposed. Three existing exclosures could be maintained without concern for wilderness values. Critical habitat for four endangered or proposed threatened or endangered fish species would continue to be designated for the Colorado River.
- About 17,570 acres would remain open for vehicular use in accordance with the RMP. About 5,510 acres would be limited to off-road vehicle (ORV) use of existing roads and trails, and about 8,080 acres would be closed to ORV use. The limited use and closed areas are adjacent to the Colorado River.
- The entire 31,160-acre area would continue to be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- About 30,160 acres of the Westwater Canyon WSA would continue to be man-

aged under Visual Resource Management (VRM) Class II with 1,000 acres under Class IV.

- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources. Except for the prescribed burn along the western boundary of the WSA, the area would be managed under a limited fire suppression policy.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.
- The 13-mile segment of the Colorado River within the WSA could be designated for preservation as part of the 55.7 miles studied under the Wild and Scenic Rivers Act, as amended. This would include a .25-mile corridor on each side of the river. Such a designation could occur under the No Action Alternative or under either the All Wilderness or Partial Wilderness Alternatives as a separate activity; therefore, this designation is not analyzed as part of the wilderness study.

ALL WILDERNESS ALTERNATIVE

Under this alternative, all 31,160 acres of the Westwater Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981a) to preserve its wilderness character. Upon designation, acquisition of 2 sections (1,120 acres) of State land within the WSA (refer to Map 1) is likely and would be authorized by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) All or parts of seven State sections (4,120 acres) adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts

WESTWATER CANYON WSA

Map 2

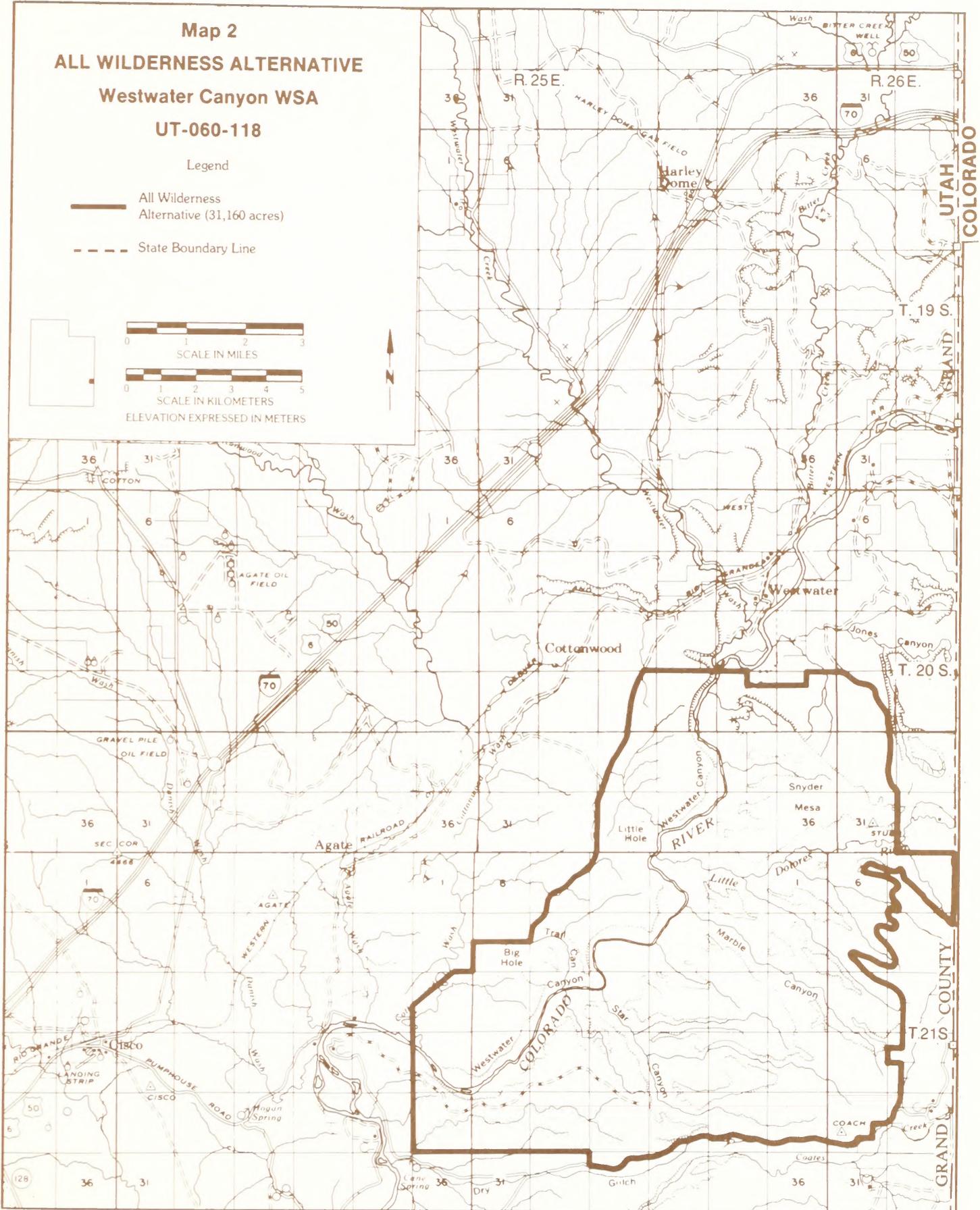
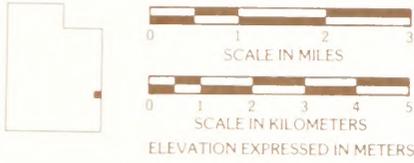
ALL WILDERNESS ALTERNATIVE

Westwater Canyon WSA

UT-060-118

Legend

-  All Wilderness Alternative (31,160 acres)
-  State Boundary Line



WESTWATER CANYON WSA

to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. Private lands in four locations adjacent to the WSA would not be affected by wilderness designation. No private lands are located within the WSA.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 31,160 acres would be withdrawn from mineral location and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed on that portion of the 1,805 acres of the 23 existing mining claims that may be determined valid. Development would be regulated by unnecessary or undue degradation guidelines (43 CFR 3809) with consideration given to wilderness values. Existing oil and gas leases, involving 480 acres, would be phased out upon expiration unless a find of oil or gas resources in commercial quantities is shown. New oil and gas leases would not be issued.
- Present domestic livestock grazing would be allowed to continue as authorized in the Grand Resource Area RMP. The 545 AUMs on five allotments in the WSA would remain available to livestock as presently allotted. After designation, existing developments (three stock reservoirs and several short-gap fences) would be used and maintained in the same manner as in the past, based on practical necessity and reasonableness. New range developments would be allowed on a case-by-case basis if necessary for resource protection (range and/or wilderness) and the effective management of these resources, subject to wilderness protection standards as described in Appendix 1. The proposed 500-acre burning-and-seeding project would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting eminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. Impoundments, pumping facilities, or diversion structures on the Colorado River in the WSA would not be allowed. No water resource facilities or treatments are presently planned.
- Wildlife transplants and developments would be allowed after designation if compatible with wilderness values. Projects would be considered for approval on a case-by-case basis and would be allowed as long as certain criteria (refer to Appendix 1) are met to adequately protect wilderness values. At this time, no wildlife projects are planned in this WSA. The three existing exclosures would continue to be maintained.
- The entire 31,160-acre area would be closed to ORV use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 22.5 miles of existing vehicular ways in the WSA would not be available for vehicular use except as indicated above. The WSA boundary follows about 13 miles of existing gravel and dirt roads which would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 31,160-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 31,160 acres would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 31,160-acre area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least

adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.

- Any activity to gather information about natural resources in the 31,160-acre area would be allowed by permit provided it was carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles. River recreation would be allowed to continue on the Colorado River through the WSA by a BLM permit system as presently occurs. Low speed, wakeless downstream use of small outbound motors would be allowed to continue.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE (PROPOSED ACTION)

Under this alternative, 26,000 acres of the Westwater Canyon WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA with the most outstanding wilderness characteristics. The 26,000 acres analyzed as wilderness under this alternative include all of the Colorado River portion and the most varied terrain in the WSA. The 5,160 acres in four locations within the WSA, but outside of that area designated as wilderness, would be managed in accordance with the Grand Resource Area RMP as described for the No Action Alternative. The 5,160

acres are comprised of 130 acres near Picture Gallery Ranch, 500 acres southeast of Snyder Mesa, 1,660 acres southwest of Big Hole, and 2,870 acres in the southwest corner of the WSA. The 26,000-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative.

This alternative would likely involve Federal acquisition of two sections (1,120 acres) of State land by purchase or exchange. (Refer to Volume I for further information regarding State in-holdings.) Four State sections or parts thereof adjacent to the potentially designated portion of the WSA likely would not be exchanged. Assumptions regarding analysis and impacts for State lands involved in the Partial Wilderness Alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only. Private lands in four locations adjacent to the lands designated in this alternative would not be affected. No private or split estate lands are located in the designated portion of the WSA.

A summary of specific actions follows:

- The 26,000-acre wilderness would be withdrawn from mineral entry and closed to new mineral leasing and sale. Development work, extraction, and patenting would be allowed on portions of 1,805 acres of existing mining claims that may be found to be valid. Development would be regulated by unnecessary or undue degradation guidelines with consideration given to wilderness values. The existing oil and gas leases which cover 190 acres would be phased out upon expiration unless an oil or gas find in commercial quantities is shown. New oil and gas leases would not be issued in the 26,000-acre area. The 5,160-acre area not designated wilderness would be open to future mineral location, leasing, and sale. Development work, extraction, and patenting of future claims, if any, could occur in the 5,160-acre area if claims are valid. The area not designated would be managed as leasing Category 1 (standard stipulations) on 4,220 acres; Category 2 (standard and special stipulations) on 820 acres; and Category 3 (no surface occupancy) on 120 acres. Existing leases (290 acres) and future leases in this area could be developed without concern for wilderness values.

WESTWATER CANYON WSA

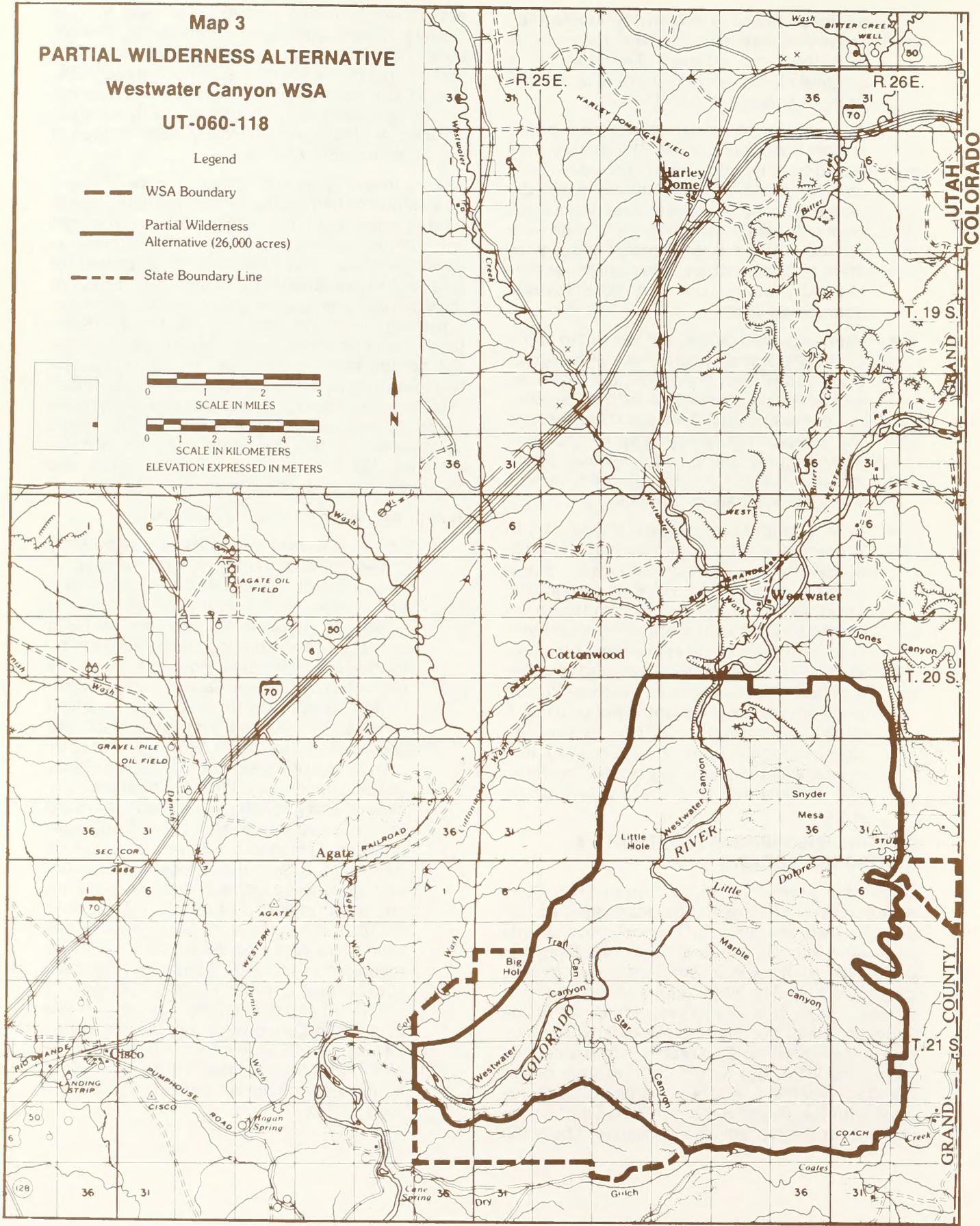
Map 3 PARTIAL WILDERNESS ALTERNATIVE Westwater Canyon WSA UT-060-118

Legend

-  WSA Boundary
-  Partial Wilderness Alternative (26,000 acres)
-  State Boundary Line



ELEVATION EXPRESSED IN METERS



UTAH
COLORADO

GRAND
COUNTY

WESTWATER CANYON WSA

- Domestic livestock grazing would continue to occur in the 26,000-acre wilderness area. The 520 AUMs in the 26,000-acre area would remain available to livestock as presently allotted. Existing range facilities (one reservoir and short-gap fences) could be maintained based on practical necessity and reasonableness. New range developments could be allowed in the 26,000-acre wilderness if necessary for protection and management of the rangeland and/or wilderness resource, provided that wilderness protection standards are met. In the 5,160-acre nonwilderness area, livestock grazing would be allowed (25 AUMS) without wilderness considerations. In this area, the 500-acre burning-and-seeding project could be carried out. The two reservoirs and short-gap fences located in the nondesignated area would be maintained as necessary without concern for wilderness values.
- In the 26,000-acre wilderness, new water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed only if enhancing to wilderness, if necessary to correct conditions that are imminently hazardous to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act*. In the remaining 5,160-acre area, water resource facilities would be allowed without concern for wilderness values if in accordance with the RMP. None are now proposed.
- In the 26,000-acre wilderness, wildlife transplants or habitat improvements would be allowed only if they are compatible with wilderness values. In the remaining 5,160-acre area, wildlife transplants or developments would be allowed without concern for wilderness values.
- The area that would comprise the 26,000-acre wilderness would be closed to ORV use. About 10 miles of existing ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. About 12 miles of road and other road segments that border the WSA would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 26,000-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the 26,000-acre wilderness would not be allowed except for harvest of pinyon nuts or non-commercial gathering of dead-and-down wood, if accomplished by other than mechanical means. The remaining 5,160 acres would be open to woodland harvest, although none is planned.
- Visual resources on the 26,000-acre wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The remaining 5,160 acres would be managed as VRM Class II on 4,920 acres and Class IV on 240 acres.
- Within the 26,000-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques. In the 5,160-acre nonwilderness area, measures of control would be taken without wilderness considerations.
- In the 5,160-acre nonwilderness area, any activity to gather information about natural resources would be allowed by permit. In the 26,000-acre wilderness, such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the 5,160-acre area, hunting would be allowed subject to applicable State and Federal laws and regulations. In the 26,000-acre wilderness, hunting would be

allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means. River recreation would be allowed by permit, and low speed, wakeless downstream use of small outboard motors would be allowed to continue.

- In the 5,160-acre area, control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. In the 26,000-acre wilderness, control of predators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 presents the main environmental consequences resulting from implementation of the alternatives. Only those resources that would be affected significantly or differently by the alternatives are listed in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Unless otherwise indicated, information for this section was taken from the Grand Resource Area RMP and other BLM technical reports and documents.

Air Quality

The WSA has a Prevention of Significant Deterioration (PSD) Class II air quality classification under the 1977 Clean Air Act amendments and currently meets national air quality standards. The nearest Class I area is Arches National Park, located about 20 miles southwest of the WSA. Colorado National Monument, about 15 miles east of the WSA, has been classified by the State of Colorado as a Category 1 area. No significant sources of air pollution are close enough to affect this WSA. Visual range in the general vicinity is good and averages between 100 to 132 miles during the summer (Aerocomp, Inc., 1984).

Geology

Westwater Canyon WSA lies on the western edge of the Uncompahgre Uplift, a physiographic feature of the Colorado Plateau. It is part of the Canyonlands Section of the Colorado Plateau Physiographic Province. The Colorado River flowing from north to south forms Westwater Canyon within the WSA. Three major side canyons enter Westwater from the east: Little Dolores, Marble, and Star Canyons. A short box canyon, Little Hole, and a rincon, Big Hole, are the main features northwest of the river. Elevation ranges from approximately 6,500 feet in the southeastern corner of the WSA and about 5,000 feet at the cliff top east of the river to about 4,100 feet where the Colorado River leaves the WSA. Two prominent geologic features mark the WSA. Black pre-Cambrian gneissic rock with bands of white quartz and dark granite is exposed at the bottom of Westwater Canyon. The second feature is a large fault that runs across the head of Westwater Canyon, marking an abrupt boundary between the pre-Cambrian gneiss and much younger red Jurassic-Triassic sandstones.

The majority of the WSA lies south of the fault. Surface stratigraphy of this area includes the canyon systems cut through Triassic Wingate and Chinle Formations into the older pre-Cambrian strata below. The black pre-Cambrian gneiss, formed 1.7 billion years ago, underlies the sedimentary rock. Mesa tops east and west of the river have exposed outcrops of Jurassic Kayenta sandstones. Northeast of the fault the surface is predominantly Kayenta with small amounts of Entrada, Summerville, and the Salt Wash Member of the Morrison falling within WSA boundaries.

Westwater is a canyon within a canyon. The narrow inner gorge is rimmed by a wide shelf or the floor of the upper canyon. The side canyons of Little Dolores, Marble, and Star meet this upper canyon floor 100 to 200 feet above the Colorado. Sheer red sandstone cliffs form the walls of the upper canyon, rising to rolling mesa tops some 600 feet above the river.

The WSA contains several rock formations of scenic interest. Alcoves and pinnacles have formed in the Wingate cliffs throughout the WSA. Smokey Bear Point and Wingate Arch near Marble Canyon are two features of note.

Soils

The Westwater Canyon WSA is characterized by broad cuestas and/or structural benches cut by deep canyons. About 40 percent of the area is

WESTWATER CANYON WSA

TABLE 1 SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES WESTWATER CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (31,160 Acres)	Partial Wilderness Designation (26,000 Acres) (Proposed Action)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 100,000 tons of manganese.	Assuming a worst-case analysis, the recovery of manganese would be foregone. Due to the low likelihood of recovery of this mineral resource, however, the loss of development opportunity would not be significant.	Although likelihood is low, up to 18,000 tons of manganese could be recovered.
Wildlife	Less than 0.1 percent of the WSA could be affected by development of manganese, which could adversely affect wildlife habitat. Wildlife would benefit from the proposed land treatment.	Wildlife would benefit from solitude, but the proposed land treatment would not occur.	Wildlife in the designated area would benefit from solitude. Less than 0.1 percent of the nondesignated area could be disturbed by development of manganese, but wildlife would benefit from the proposed land treatment.
Livestock	Grazing of 545 AUMs and maintenance of existing developments would continue. A proposed 500-acre land treatment could be implemented and would produce 63 AUMs.	Grazing of 545 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. New developments proposed in the future might not be allowed. The 500-acre land treatment would not be allowed and about 63 AUMs of potential forage would be lost.	Grazing of 545 AUMs and maintenance of existing developments would continue. The proposed land treatment would be in the undesignated portion and could be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 523 acres.	Visual quality could be impaired on up to 23 acres.	Visual quality could be impaired on up to 523 acres, including 19 acres in the designated portion. About 83 percent of the Class A scenery would be in the designated portion and would be protected by the reduced potential for disturbance.
Recreation	ORV use would continue on 22.5 miles of ways. Overall recreational use could increase from the present 11,710 visitor days per year to 14,388 over the next 20 years. Up to 23 acres of mineral-related disturbance and 500 acres of land treatments could reduce the quality of primitive recreation, which is less than outstanding in the area to be treated.	The WSA, including 22.5 miles of ways, would be closed to ORV use. Recreational use could increase to up to 17,116 visitor days per year over the next 20 years due to publicity associated with wilderness designation.	ORV use could continue on 12.5 miles of ways in the undesignated portion. Recreational use could increase up to 16,630 visitor days per year.

WESTWATER CANYON WSA

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
WESTWATER CANYON WSA

Resource	Alternatives		
	No Action	All Wilderness (31,160 Acres)	Partial Wilderness Designation (26,000 Acres) (Proposed Action)
Wilderness Values	Wilderness values could be lost on up to 523 acres (1.7 percent of the WSA).	Wilderness values would be protected, except on up to 23 acres (less than 0.1 percent of the WSA) which may be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 19 acres which could be disturbed by development of valid existing rights. Additional impairment could be expected on 9.8 percent of the 5,160 acres not designated. Overall, wilderness values could be lost on 1.7 percent of the WSA. About 83 percent of the area meeting the standards for naturalness and all of the area meeting the standards for outstanding opportunities for solitude and primitive recreation would be in the designated portion and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Grand County Master Plan</i> , State of Utah plans and policies, and the current BLM Grand RMP.	This alternative would not be consistent with Grand County's concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM Grand RMP.	Partial designation would be the same as the All Wilderness Alternative, except that the portion not designated would be consistent with Grand County policy.
Socio-economics	Annual local sales of less than \$1,513,200 and Federal revenues of up to \$13,703 would continue. An additional \$89,787 per year in Federal revenues could be derived from leasing of presently unleased areas. Land treatments of 500 acres could result in up to \$315 in additional local economic benefits and \$89 in Federal grazing revenues.	Annual local sales of up to \$1,513,200 and Federal income of \$12,263 would continue, but Federal revenues of up to \$90,927 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA. Local economic benefits of \$315 and Federal grazing revenues of \$89 would be foregone because land treatments would not occur.	The effects of Partial Wilderness Designation would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by an undetermined amount. Local economic benefits of \$315 from additional AUMs resulting from land treatments and Federal revenues of \$89 per year could result from land treatments.

WESTWATER CANYON WSA

composed of rock outcrop occurring as slickrock on the cuesta and canyon walls. About 30 percent of the area is composed of shallow or deep sandy soils on the surface of the cuesta. About 20 percent is moderately deep to very deep stony soils on steep sides of canyons. About 10 percent are very deep loamy soils on gently sloping alluvial fans and along drainages on canyon floors. Table 2 shows soil characteristics and land types and Table 3 describes erosion conditions.

TABLE 2
Soil Characteristics and Land Types

Soil Characteristics and Land Types	Percent of Area	Acres	Estimated Rate of Erosion (cubic yards/acre/year)	
			Present Condition	Bare Soil Surface
Rock outcrop	40	12,464	0	0
Shallow or deep sandy soils on sloping cuestas and structural benches	30	9,348	1	5
Very deep loamy soils on gently sloping alluvial fans and floodplains	10	3,116	0.1	1.0
Moderately deep to very deep stony soils on steep canyon sides	20	6,232	1	10
Totals	100	31,160		

Source: Hansen, 1985.

TABLE 3
Erosion Condition

Erosion Class	Erosion Rate (cubic yards/acre/year)	Annual Soil Loss Under Present Conditions		Annual Soil Loss If Disturbed	
		Percent of Area	Cubic Acres	Percent of Area	Cubic Acres
Very High	20	—	—	—	—
High	10	—	—	20	6,232
Medium	5	—	—	30	9,348
Low	1	50	15,580	10	3,116
Very Low	0.1	10	3,116	—	—
None	0	40	12,464	40	12,464
Totals		100	31,160	100	112,176 ¹

Source: Hansen, 1985.

¹Average annual soil loss in cubic yards per acre: 0.51 under present conditions; 3.60 if disturbed.

Vegetation

The majority of the WSA is covered by various pinyon and juniper vegetation communities of varying density and associated species (USDI, BLM, 1974). Other woodland species include

single-leaf ash, mountain mahogany, and a few isolated aspen in protected areas. Short grasses grow throughout the WSA mixed with small sagebrush (black sage) (USDI, BLM, 1981b). Riparian areas occur intermittently in a narrow band along the Colorado River (13 miles total length in the WSA), in spots along the Little Dolores River (4.5 miles), along Cottonwood Wash (2.5 miles), and along some other washes. Riparian species include cottonwood, tamarisk, shrub willow, and sedges; sage grows along washes in drier areas. Portions of the WSA with rock outcrops have little vegetation. The WSA has been divided into six vegetation types as shown on Table 4.

TABLE 4
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Pinyon-juniper woodland	16,726	54
Juniper-sagebrush	7,790	25
Pinyon-juniper/blackbrush	4,674	15
Sagebrush	1,558	5
Rock outcrop	312	1
Riparian	100	Less than 1
Total	31,160	

Source: USDI, BLM, 1972.

Three sensitive plant species may occur within the WSA. *Astragalus eastwoodiae* is found just north of the WSA and is considered a narrow endemic that may extend into the WSA. Hanging gardens are located in seeps along cliffs in the WSA and are possible locations for *Aquilegia micrantha*, a narrow endemic in southeast Utah. *Cryptantha elata*, a candidate species under review by the Fish and Wildlife Service (FWS) for possible future listing as threatened or endangered, may occur in the WSA. Potential locations or acreages involved are unknown.

The Westwater Canyon WSA lies in the Colorado Plateau Ecoregion Province as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) types of the WSA are saltbush-greasewood and juniper-pinyon woodland as listed on Table 5. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

TABLE 5
Potential Natural Vegetation Types

PNV Type	Acres	Percent of WSA
Saltbush-greasewood	9,348	30
Juniper-pinyon woodland	21,812	70
Total	31,160 (excluding river bed)	

Source: USDI, Geological Survey, 1978.

Water Resources

The predominant water feature of the WSA is the Colorado River. Approximately 13 miles of the river are within the WSA. The Little Dolores, a perennial stream outside the WSA, is depleted by agricultural use before entering the WSA. There are also four intermittent streams in the WSA. The WSA contains two undeveloped springs and three livestock reservoirs.

Water quality of the Colorado has been adversely affected by erosion. Sedimentation and salinity have increased dramatically over the past several years. Reduction of erosion and sedimentation is of the utmost importance along the Colorado. Besides the high water quality value for recreational use in Westwater Canyon, downstream water users require high priority.

Water quality data have been collected for the Colorado River at a gauging station near Cisco, 16 miles downstream from the WSA. Between 1929 and 1957, this station recorded an average annual discharge of 5,255,000 acre-feet, with an average annual salt yield of 4,363,000 tons (a total dissolved solids [TDS] concentration of 610 milligrams per liter [mg/l]). Between 1966 and 1975, the average annual discharge was 4,569,000 acre-feet, with an average annual salt yield of 3,816,000 tons (a TDS concentration of 614 mg/l) (USDI, BLM, 1977). This is not a higher rate of sedimentation or salinity than recorded elsewhere in the State of Utah.

There are no irrigation use rights within the WSA, but irrigated agricultural areas are adjacent to the WSA to the north and west. Irrigation water for these areas is taken directly from the Colorado.

There are no water wells in this area; therefore, no direct ground water quality data are available. However, the sedimentary sandstones and siltstones situated in this WSA characteristically have been found elsewhere to yield fresh water to springs and wells. The Kayenta Formation, the dominant surficial bedrock unit of the WSA, generally acts as an aquitard by restricting the

downward movement of ground water to the lower sedimentary formations. This reduced recharge will generally result in low yields from all underlying sedimentary formations. The older pre-Cambrian crystalline rocks, located mainly in Westwater Canyon and in the adjacent side canyons, are not considered water-bearing formations. No data are available for these crystalline rocks. Water quality should be acceptable for recreation, wildlife, livestock, and agricultural uses, especially in the absence of the highly saline Mancos Shale.

Mineral and Energy Resources

The BLM, in cooperation with the U.S. Department of Energy, had each WSA in Utah assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the assessment rating system. The energy and mineral rating summary for the Westwater Canyon WSA is given in Table 6.

TABLE 6
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f1	c3	None
Uranium	f1	c2	None
Coal	f1	c4	None
Geothermal	f1	c3	None
Hydropower	f1	c4	None
Copper	f1	c1	None
Manganese	f2	c1	Less than 100,000 tons of 40-percent manganese
Potash	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

An overall importance rating (OIR) of 1 was assigned to the WSA by SAI (1982). The OIR is given on a scale of 1 to 4, where 4 is equated with high mineral importance. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report. Reports will be made available to the public and will be submitted to the President and Congress as required by the Federal Land Policy and Management Act (FLPMA). BLM and the Secretary of the Interior will also consider these reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. There are no minerals currently listed as strategic and critical found within the WSA. The WSA could contain deposits of manganese that is currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

Restrictions on mineral development within the WSA are currently in effect along the Colorado River. The Wild and Scenic Rivers Act Amendment of 1975 temporarily withdrew a corridor 0.25-mile wide on each side of the river from mineral mining and other uses, but not from mineral leasing. This withdrawal covers a total of 4,160 acres within the WSA and will remain in effect until Congress acts on study recommendations. Bureau of Reclamation withdrawals along the river, dating to 1910 for a Dewey reservoir site, did not include mineral leasing or salable minerals; since 1955 these areas have been open to location of mining claims subject to the terms of the withdrawal. The Bureau of Reclamation applied in 1971 to revoke the withdrawals, but final action has not been taken on these applications.

LEASABLE MINERALS

Other than oil and gas, no minerals are leased within or adjacent to the WSA. Other leasable minerals produced regionally include potash and coal.

Oil and Gas

There appears to be no favorability for oil and gas within the WSA. Because the younger Triassic Formations lie unconformably on the ancient pre-Cambrian rocks, there has been no deposition of

the Paradox Basin formations (Devonian, Mississippian, and Pennsylvanian) that serve as host rock in the vicinity for hydrocarbon resources. Oil and gas are produced from Jurassic and Cretaceous rock within the Uncompahgre Uplift north and northwest of the WSA. These sediments are younger than those occurring in the WSA. Strata known to produce oil and gas in the general region do not occur in the WSA.

The tract evaluated by SAI contains 37,460 acres, somewhat larger than the WSA (the WSA represents about 83 percent of the tract evaluated). The SAI rating (f1) indicates that known source rocks do not exist within the tract. The certainty level (c3) indicates a fairly high level of data regarding the underlying strata, based on a number of wells drilled within or near the tract. Three dry holes have been drilled within 1 mile of the WSA to the west and in the Cisco Desert Field, with dozens of holes (both dry and producing) located about 3 miles northwest of the WSA.

The SAI report does mention the recent theory that the Uncompahgre Uplift may overthrust younger Paleozoic rocks at great depth, and that favorable structural traps may occur. There are no available data to appraise this theory, however.

The area of the WSA was included in the Moab District Oil and Gas Environmental Analysis Report (USDI, BLM, 1975), which established oil and gas leasing categories to protect certain resource values (exclusive of wilderness values). The majority of the WSA had restrictions established on oil and gas leasing.

Under the BLM oil and gas leasing category system, the central part of the WSA is closed to leasing or has no surface occupancy. Perimeter areas are open to leasing. Most open areas in the eastern half are open with special stipulations to protect wildlife habitat. One perimeter area within the WSA is under lease. This involves only 480 acres (less than 1 percent of the WSA).

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations that require exploration and

WESTWATER CANYON WSA

development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981a). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA. The 480 acres of oil and gas leases in the WSA are pre-FLPMA.

Leases producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases.

Table 7 indicates leasing categories for the WSA.

TABLE 7
Oil and Gas Leasing Categories

Category	Acres of WSA	Percent of WSA
Open	15,546	50
Open with special stipulations	820	3
Open with no surface occupancy	14,043	45
Suspended or no lease	751	2
Total	31,160	

Source: USDI, BLM, 1975.

Coal and Potash

Coal-bearing strata found in the Book Cliffs about 15 miles north and northwest of the WSA are younger Cretaceous rocks that were either not deposited within the vicinity of the WSA or have weathered away. Potash is produced about 40 miles to the southwest of the WSA from the Texas-gulf plant near Moab. Production is from Paradox Basin salts, and the entire Paradox Basin is considered generally favorable for potash and other salts. The WSA falls northeast of the limits of the Paradox Formation and the salt-bearing strata were not deposited within the WSA.

Both potash and coal have been assigned an f1 rating by SAI, which indicates that the target strata are not present. Both have been assigned a certainty rating of c4, which indicates a high degree of certainty, based on drilling data from the vicinity, regarding the knowledge of geologic formations underlying the WSA.

Geothermal

There is low potential for geothermal resources on the Colorado Plateau as a whole, and particularly in Westwater Canyon, because of (1) high drilling costs; (2) the great depth to the resource; (3) the small number of potential users, due to the area's remoteness; and (4) the low temperature (20 to 90 degrees Centigrade [C]) of any geothermal steam present, which would probably be suitable only for space heating.

Hydroelectric

Although old power site withdrawals indicate that at one time there was some interest in developing the hydroelectric potential of the Colorado River, this area was not identified by the Army Corps of Engineers as a potential hydroelectric site. There are no plans for this type of development in the WSA.

LOCATABLE MINERALS

The WSA is not considered favorable for uranium, vanadium, copper, silver, or other hardrock minerals produced within the region. Uranium, with associated vanadium and copper, occurs in the Chinle and Morrison Salt Wash Formations. The Morrison occurs only peripherally within the WSA. The Chinle, while present within most of the WSA, does not contain the basal sandstone members which are the targets for uranium exploration. These three minerals have all been rated f1 by SAI, which indicates an extremely unfavorable geologic environment for deposition of uranium and related minerals. All are given a certainty rating of c4, which indicates a high degree of knowledge of the underlying geology of the WSA, based on drill data in the vicinity. Manganese is given a slightly higher rating (f2). Manganese is found in the Morrison and Summerville Formations, both absent in the WSA, and in the Chinle, present in the WSA. For this reason, the WSA is thought to be marginally favorable for manganese, but deposits would be small (less than 100,000 tons of 40-percent manganese). No direct data to support or refute this rating are available; therefore, the WSA has been assigned a certainty rating of c1.

There have been attempts in the past to recover gold and silver from placer mines in Westwater Canyon, but none have been economically successful. Placer claims are currently being worked along the northern end of the canyon and in Big Hole near the WSA.

Two groups of post-FLPMA placer claims fall within the WSA. As of 1983 a total of 23 claims

WESTWATER CANYON WSA

covering 1,805 acres (6 percent of the WSA) was included. One group of claims does not indicate if assessment work is current. The other group shows assessment work for the year of location (in which assessment work is not required). Any claim not current in statutory assessment work would be null and void. Some claims may overlap various withdrawals along the Colorado River. Claims staked in a withdrawn area would be void from the time of location. Claims may also be declared invalid if other statutory requirements are not met.

SALABLE MINERALS

Small sand and gravel deposits are found in bars along the Colorado River in Utah. Virtually no sand and gravel resources occur within the WSA, although one small terrace deposit has been identified in the vicinity of Big Hole. There has been no interest in this deposit to date because of its small size and inaccessible location. The WSA would be expected to have a low favorability in respect to sand and gravel resources.

Wildlife

The Westwater Canyon WSA provides habitat for a variety of wildlife species. Currently, the area provides winter range for mule deer, year-round habitat for coyote, cougar, bobcat, cottontail rabbit, various other small mammals, birds (including several raptors), fish, reptiles, and amphibians. Year-round habitat is also provided for re-established desert bighorn sheep.

Big game species include mule deer, cougar, and desert bighorn sheep. Important year-round habitat is provided along the Colorado River for mule deer and desert bighorn sheep. About 35 mule deer (72 AUMs) and 20 bighorn sheep (42 AUMs) inhabit the area. The best habitat for desert bighorn sheep is found on Snyder Mesa, Big Hole, and Star and Marble Canyons. Cougar inhabit the same areas as mule deer.

Upland game include mourning dove and cottontail rabbit. Mourning dove are common in the WSA in late spring and summer. It is believed that nesting areas are concentrated around cultivated areas outside of the WSA such as the Rose Ranch, Westwater Ranch, and along the river systems. Cottontail rabbits can be found throughout the WSA.

The WSA provides habitat for several bird species. The most common are canyon wrens, rock wrens, killdeer, rock dove, red-tailed hawks, golden eagle (BLM sensitive species), marsh

hawks, kestrels, and ravens. Great blue herons nest along the Colorado just west of the WSA and may be found within the WSA boundary. Several raptor nests are located in Westwater Canyon. Waterfowl habitat is located primarily in the Colorado and Little Dolores river systems. Mallards, blue-winged teal, mergansers, shovelers, and Canada geese commonly winter along the river. Year-round habitat is provided a few resident waterfowl. A substantial population of Canada geese winter on the farms adjacent to the WSA.

Several species of fish inhabit the Colorado and Little Dolores Rivers. Most common are carp, channel catfish, bluegill, flannelmouth sucker, red shiner, and speckled dace. Common species of reptiles and amphibians present are the red-spotted toad, bullfrog, side-blotched lizard, striped whipsnake, and gopher snake.

Two endangered raptors can be found in the WSA: the bald eagle and American peregrine falcon. Both have been sighted along the Colorado in Westwater Canyon. Nest locations have not been documented. They may use the entire WSA.

Three listed or proposed endangered aquatic species are known to occur in the Colorado River within the WSA: the Colorado River squawfish, the humpback chub, and the bonytail chub. The razorback sucker, a candidate species under status review, is also known to occur in the river within the WSA. These species are also presently protected by Utah State law.

The Colorado River corridor (about 4,160 acres within the WSA, or 13 percent) provides the most essential wildlife habitat within the WSA and has been designated critical habitat for the four endangered, proposed, or candidate fish species and two endangered raptors present. Three exclosures are located in the WSA. One 20-acre exclosure, located near the WSA's western boundary, was installed to improve wildlife habitat by excluding cattle. The other two exclosures are less than 1 acre in size.

Forest Resources

No forest products are presently produced from the WSA. The potential exists for Christmas trees, cedar posts, and firewood to be harvested. However, due to the remote location of the WSA, lack of access, and abundant more favorable areas elsewhere, no harvest of forest products is anticipated from the WSA in the foreseeable future.

WESTWATER CANYON WSA

Livestock and Wild Horses/Burros

The WSA contains portions of five grazing allotments (three cattle and two sheep). With the exception of Horse Pasture of the Buckhorn AMP Allotment, grazing was authorized in all allotments when FLPMA was passed. The three cattle allotments are under a management plan, and the WSA portion of these allotments is not grazed every year. Grazing is not presently authorized in the Horse Pasture of the Buckhorn AMP Allotment. Table 8 gives livestock grazing use data for the WSA.

Range projects of record within the WSA are three livestock reservoirs in the southwestern part of the WSA (Knowles Pasture of the Buckhorn Allotment) and short-gap fences of undetermined location.

Presently there is no agricultural activity within the WSA. There are some irrigated lands within 0.50 mile of the WSA at four locations: Picture Gallery Ranch, Wild Ass Ranch, Westwater Ranch, and Rose Ranch.

Wild horses or burros are not known to inhabit the WSA.

Visual Resources

The WSA is characterized by dramatic visual contrasts. Red sandstone cliffs, with ribbons of desert varnish, rise high above the lower canyon walls of black rock patterned with bands of white quartz and dark reddish granite. The Colorado River with its whitewater rapids has polished the sides of the inner canyon to a smooth gloss and carved out potholes and caverns.

The entire WSA was subjected to a visual inventory in 1976. (Refer to Appendix 7 for an explanation of BLM's VRM rating system.) The entire WSA is rated as Class A scenery. This indicates that scenery has been judged to have a combination of the most outstanding features common to the physiographic region.

The areas that can be seen from within the Colorado River corridor and the major side drainages to the east were evaluated as foreground/midground distance zone and high visual sensitivity level, and were given a VRM Class II status. A narrow strip along the southern boundary, encompassing about 1,000 acres, has been evaluated as seldom seen distance zone, low visual sensitivity level, and given a VRM Class IV status.

TABLE 8
Livestock Grazing Use Data

	Allotments				
	Agate	Little Hole	Buckhorn	Lost Spring Canyon ¹	Fish Park ²
Class of Livestock	Sheep	Sheep	Cattle Sheep	Cattle	Cattle
Number of Operators	1	1	2	1	1
Season of Use	2/11-5/20	1/1-3/10	10/1-5/31 11/1-3/31	11/1-5/31	10/1-11/15
Total AUMs ²	623	990	2,743 2,994	3,066	695
Active Preference AUMs in WSA	9	123	152	161	100
Percent of Allotted AUMs in WSA	1	12	3	5	14
Total Acres ²	16,120	15,245	77,372	42,181	3,943
Acres in WSA	300	7,700	9,100	12,860	600
Percent of Allotment in WSA	2	51	12	30	15

Source: USDI, BLM, 1972.

¹Administered by BLM's Grand Junction District, Colorado.

²These are totals for the allotment. The WSA incorporates only a portion of each of these allotments.

WESTWATER CANYON WSA

Cultural Resources

No complete inventory has been made of the WSA, but four historic and nine prehistoric sites are known. Historic sites are associated with early mining camps and an outlaw hideout; prehistoric sites include camps and rock art. None of the prehistoric sites within the WSA are on the National Register, nor are any proposed. The potential for discovery of additional sites is high. European influence in the region dates from the early 1800s.

Ranching spread to the WSA in the 1890s along the Grand River (now Colorado) and from the State of Colorado. The oldest known historic site is the Miner's Cabin (also called Malin Cabin), a dugout near the head of Westwater Canyon built about 1912. In the late 1920s a placer operation began about 0.25 mile downstream from Miner's Cabin; several dugout cabins and sheds still remain. About 1913 two outlaws hid out in a cave on the east side of the river. One of the outlaws is buried just downstream from the cave.

Recreation

Although it is only 7 miles southeast of I-70, the WSA is difficult to reach. The nearest community, Cisco (population less than 50), is about 5 miles west of the WSA. The abandoned townsite of Westwater lies about 1 mile north of the WSA. The nearest towns of any size are Grand Junction, Colorado, about 25 miles east, and Moab, Utah, about 30 miles southwest. The portion of the WSA

north of the Colorado River is accessed by dirt roads leading from I-70 through Westwater or Cisco, and the portion south of the river by an unimproved road leading west from Glade Park, Colorado. The Colorado River is accessed from the BLM ranger station near Westwater.

Westwater Canyon is heavily used for recreation. The primary attraction is the opportunity for whitewater river running and related camping and hiking. The whitewater is considered among the most challenging on the Colorado River. Rapids are rated as Class III to V on the International Scale of Whitewater Difficulty (Class VI is the most difficult rating given to rapids).

Inflatable rafts are the most commonly used craft, although kayaks are becoming more popular. Motors are sometimes used on flatwater.

A permit system was instituted by the BLM in 1974 to monitor use by both commercial outfitters and private parties. The BLM maintains a river ranger station just north of the WSA. Maximum use currently allowed is 14,000 passenger days annually for the season from May through September. Visitor use is summarized in Table 9. Use is near the carrying capacity based on studies of environmental, physical, and social constraints. It is generally in accord with the river management plan which specifies 14,000 visitor days as the upper limit of use allowed. Off-season private use could increase, but this is unlikely. The whitewater rafting experience in Westwater Canyon is well known; public awareness of this portion of the WSA is high.

TABLE 9
Visitor Use Data

	Passenger Days	Number of Passengers	Number of Parties	Average Party Size	No. Parties w/motors	Percent of Parties w/motors
1978						
Private	4,447	3,228	307	10.5	9	3
Commercial	4,677	3,358	231	14.6	81	35
Total	9,124	6,586	538	12.5	90	17
1979						
Private	4,961	3,731	335	11.1	8	2
Commercial	4,657	3,450	211	16.4	102	48
Total	9,618	7,181	546	13.7	110	20
1980						
Private	5,338	3,318	284	11.5	8	3
Commercial	4,208	3,084	205	13.8	30	15
Total	9,546	6,402	489	12.6	38	8
1981						
Private	7,093	4,720	380	12.5	9	2
Commercial	4,440	3,023	245	12.6	39	16
Total	11,533	7,743	625	12.5	48	8
1982						
Private	5,574	4,027	498	8.0		
Commercial	5,059	3,582	271	12.1		
Total	10,633	7,609	769	10.1		

Source: BLM File Data.

WESTWATER CANYON WSA

Rangers also assign campsites; group number and type of camp are regulated. Ten designated campsites are within the WSA, but the number actually available depends on water level. At high water only four are available. The campsites are not developed. Informal hiking trails are used around the camps.

Some hunting for waterfowl and big game takes place within the WSA. Successful big game hunting depends on severity of winter weather. A difficult winter will push deer into the WSA from higher elevations to the southeast. No use statistics are available; however, use is estimated at probably no more than 10 hunters per year in the WSA. Some fishing, primarily for channel catfish, takes place in areas where the river bank is accessible, primarily along the western boundary and at Miner's Cabin. This use may account for up to 200 visitor days per year.

The Colorado River channel within Westwater Canyon is well defined with little or no beach or riparian area. Side washes have cut precipitous channels to the river below. Numerous rock falls and steep sides of the inner canyon have created a series of 12 rapids separated by calmer water. The Colorado River in this area is narrow and deep, about 30 feet wide at the narrowest point and up to 60 feet deep at normal flows. It drops 151 feet through the canyon, an average of 11 feet per mile.

At the lower end of Westwater Canyon the river emerges into a flat, wide bed bordered by sandstone cliffs. The water is quiet with sand bars and sand islands. The river is about 0.75 mile wide as it leaves the WSA.

Since 1975, the Colorado River within the Westwater Canyon WSA has been a study river as designated by an amendment (P.L. 93621, 1975) to the Wild and Scenic Rivers Act (P.L. 90452, 1968). The Act preserves "certain selected rivers" that "possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values . . . for the benefit and enjoyment of present and future generations." The total length of the Colorado River studied was 55.7 miles which included Westwater Canyon.

Westwater Canyon was designated as a Special Recreation Management Area (SRMA) under previous Management Framework Plans (MFPs) covering the old planning units and has been carried forward under the Grand Resource Area RMP. The WSA is entirely within the SRMA. The BLM has an active management program for

Westwater Canyon within the SRMA in the form of a river management plan, but not for the remainder of the WSA.

ORV use within the WSA probably accounts for about 60 visitor days per year. Some ORV use is made of areas along the northwest boundary and above Big Hole. An established ORV trail runs along the south rim of the river at the west end of the WSA; use appears to be associated with hunting. Short trails extend into the WSA from Picture Gallery Ranch, probably for ranching use. The remoteness of the WSA does not make it as attractive for recreational ORV use as other areas nearer to population centers.

Under the Grand Resource Area RMP, three ORV designations have been recommended in accordance with 43 CFR 8340. Approximately 8,080 acres south of the Colorado River would be designated as closed to ORVs. This would affect use in the vicinity of Miner's Cabin. Approximately 5,510 acres would be designated as limited to existing roads and trails. This would affect a portion of the WSA north of the Colorado River, including two segments of the trail leading to Cottonwood Wash overlook, and a 1-mile-wide corridor along the Colorado River in the western portion of the WSA, including part of the trail above the southern river canyon rim and the short trail along the south bank of the river. The remainder of the WSA (about 17,570 acres) would be designated as open to ORV use.

Recreational use of the remainder of the WSA is low, estimated at about 210 visitor days per year. Hiking use not related to boat support would be expected to increase, although vehicle access to the upper ends of the eastern side canyons is poor. No visitor use data have been compiled outside of river use. There are no designated or maintained trails, campsites, or facilities within this portion of the WSA. Outside of the Colorado River canyon, side canyons define hiking routes and accessibility. The many sheer cliffs limit potential hiking routes and increase hiking challenge.

Wilderness Values

SIZE

The WSA is 31,160 acres. It is about 8 miles across both north-south and east-west.

NATURALNESS

Post-FLPMA imprints include: (1) old placer claims near Miner's Cabin that were reworked in 1980 and 1984; and (2) a 20-acre enclosure on the south side of the Colorado River near the WSA's

WESTWATER CANYON WSA

western boundary, installed to improve wildlife habitat by excluding cattle. The following imprints are pre-FLPMA:

- A vehicle way (constructed but not maintained) south of the Colorado River and west of Star Canyon, which runs for 7 miles, sometimes over rock ledges;
- A vehicle way (not constructed and less than 1 mile long) that runs through a post-FLPMA enclosure on the south edge of the Colorado River at the west end of the WSA;
- A vehicle way (not maintained and presently revegetating) that runs west of Picture Gallery Ranch for about 3 miles;
- A vehicle way (constructed but not maintained) about 2 miles long that runs across a sandy area (presently revegetating) to Miner's Cabin and has been used recently for access to placer claims;
- A vehicle way (not constructed) that runs for 2 miles to Little Hole and shows evidence of some revegetation;
- A vehicle way (not constructed) that runs for 2 miles to the canyon rim south of Little Hole;
- A vehicle way (constructed but not maintained) that runs for about 1 mile to the north end of Big Hole and is presently revegetating;
- A vehicle way (constructed but not maintained) that crosses slickrock and sands in a 4-mile extension of the WSA's northwest boundary road and shows evidence of some revegetation, with a .50-mile unconstructed spur vehicle way leading south to the canyon rim;
- A 15-foot square fence enclosure near the head of Big Hole, covering less than 1 acre;
- An 8-foot square fenced enclosure near the western boundary of the WSA south of the Colorado River, covering less than 1 acre;
- Miner's Cabin, a historic site at the north end of the WSA near the river, covering less than 1 acre;
- Evidence of historic placer claims, consisting of old equipment and rubble, covering about 5 acres in the vicinity of Miner's Cabin;
- Outlaw Cave, a historic site on the Colorado River covering less than 1 acre.

- Three livestock reservoirs covering less than 1 acre.

Imprints cover a total of less than 50 acres. Thus, the entire WSA meets the standard for naturalness. Imprints, where present, are not substantially noticeable within the unit as a whole.

SOLITUDE

The size and configuration of the WSA are sufficient to give visitors a feeling of vastness.

Topographic screening is the primary factor leading to outstanding opportunities for solitude. Screening is excellent within the several canyon systems and Big Hole. Visitation within canyons cannot be observed by those outside, except from the canyon rims. Within canyons, parties traveling in opposite directions might encounter sights or sounds of one another, but diversity of travel routes into side canyons or alcoves would tend to dissipate encounters. Closely spaced parties boating or camping on the Colorado River would tend to be aware of each other, but the winding nature of Westwater Canyon and the rapids tend to minimize contacts while floating the river. Downstream, other parties are more evident to each other because of the longer lines of sight as the river broadens. Topographic screening is not as pronounced north of the river and along the southwestern boundary. Both of these areas consist of rolling uplands or mesa tops.

Vegetation screening alone does not provide significant screening within the WSA, but it enhances topographic screening in some areas. Much of the WSA is rock outcrop or has sparse pinyon-juniper vegetation. In riparian areas or on ridge tops with more dense pinyon-juniper woodland, screening potential is greater. Vegetation and topographic screening are sufficient on a majority of the WSA to provide visitors with opportunities for seclusion.

Screening is insufficient to provide significant seclusion on 10,560 acres or 34 percent of the WSA in the following areas: (1) the 6,200-acre area north of the Colorado River Canyon rim; (2) the 3,700-acre area south of the canyon rim and west of Star Canyon; (3) the 160-acre flats near Picture Gallery Ranch; and (4) the 500-acre area southeast of Snyder Mesa near the Colorado State line.

The major limiting factor to finding a secluded spot is the heavy recreation use concentrated within Westwater Canyon during the river season. Campsites are assigned by BLM rangers, and often different parties have to share an area.

WESTWATER CANYON WSA

Crowding occurs throughout the summer season and is increased at times of high water, when some of the available campsites are flooded. The Little Dolores, Star, and Marble side canyons provide limited dispersion opportunities to alleviate crowding along the river corridor. The number of permits issued by BLM could be reduced to protect solitude if necessary.

The WSA is remote, with few significant human intrusions nearby. Irrigated fields can be seen from the perimeter of the WSA but would not represent significant visual intrusions. Solitude in portions of the WSA near Picture Gallery, Wild Ass, Westwater, Rose, and Shield Ranches could be adversely affected by sights and sounds of ranch activities. Solitude in portions along the northern boundary of the WSA would be affected by sounds of the railroad, which runs about 1 mile north of the WSA, and the railroad would be visible from a few points on the north side of the WSA. There would also be some views of I-70 from a few places in the north end of the WSA, but the highway is about 4 miles distant and is not considered a significant factor.

Vistas from the WSA to distant scenic areas are possible, but the majority of potential use areas fall in canyon systems where views are confined within the WSA. Probable vistas from high points such as the north rim of the Colorado River Canyon or on Snyder Mesa would be of the Uncompahgre Uplift (in Colorado) to the east, the Book Cliffs to the north, and the LaSal Mountains to the southwest.

In summary, it is believed that the majority of the WSA presents opportunities for solitude that meet the outstanding criterion for lands under wilderness review. This applies to about 20,600 acres (66 percent) of the WSA, or the canyon systems of the WSA, where topographic screening provides excellent opportunities for seclusion. The remainder of the WSA, about 10,560 acres (34 percent), does not meet the outstanding criterion.

PRIMITIVE AND UNCONFINED RECREATION

Opportunities for primitive and unconfined recreation are outstanding within parts of the WSA, primarily because of the whitewater river running potential and related camping and hiking activities. Outstanding opportunities for challenging hiking, rock scrambling, and primitive camping also exist in side canyons. These are derived from the rugged topography, sheer cliffs, and dissected terrain which allow numerous alternate hiking routes.

River running and camping in canyons overshadow other recreation opportunities. A majority of the WSA provides opportunities for hiking in side canyon systems. None of these opportunities are outstanding in areas north of the Colorado River Canyon rim (6,200 acres); south of the canyon rim and west of Star Canyon (3,700 acres); in the vicinity of Snyder Mesa (3,800 acres); nor on the mesa tops between Star and Marble Canyons and the flat areas near ranches (9,700 acres). These areas comprise 23,400 acres, or 75 percent of the WSA. The remaining 7,760 acres, or 25 percent, meet the requirement for outstanding opportunities for primitive and unconfined recreation.

SPECIAL FEATURES

The Colorado River through Westwater Canyon has been studied and recommended for inclusion in the Wild and Scenic Rivers System. This indicates the high scenic quality and unique geologic features of Westwater Canyon. Similar exposure of pre-Cambrian rock is found only within the Grand Canyon. The geologic display viewed from the river is not only scenic, but also educational. Other geologic special features are typical to the region although they do provide scenic interest.

Habitat for threatened, endangered, or rare species (both plants and animals) is present but not localized to the WSA. Cultural sites present are not unique to the WSA. The historic sites are less typical than the Indian habitation sites.

The WSA is the westernmost of three contiguous BLM WSAs (refer to Map 1). Black Ridge Canyons West WSA (CO-090-113A/UT-060-116/117), which straddles the Utah-Colorado State line to the east, contains 54,290 acres. Black Ridge Canyon WSA in Colorado (CO-070-113) contains 18,150 acres and is adjacent to Colorado National Monument near Grand Junction; it is located 1 mile from the Monument's proposed wilderness area.

Land Use Plans and Controls

There are no private lands, private subsurface rights, rights-of-way, or pending applications in the WSA. Two tracts of State lands (1,120 acres) within the WSA are currently undeveloped but are leased for oil and gas and hydrocarbons. There is no vehicular access to either State in-holding and lack of access has made development infeasible. It is the policy of the State of Utah to maximize economic return from State school lands.

There have been legal questions in the past regarding State vs. Federal ownership of the Colorado River bed. The portion of the river through the WSA has not been adjudicated.

The Dolores Triangle portion of the WSA is covered by a Habitat Management Plan (USDI, BLM, 1979c). River management in Westwater Canyon is managed by a plan published in the *Federal Register* in 1976. The FWS administers a program for recovery of protected fish species in the Colorado River within the WSA and administers the Endangered Species Act of 1973.

The *Grand County Master Plan* (University of Utah, Bureau of Community Development, 1979) does not specifically address the Westwater Canyon WSA; however, wilderness designation is not favored within the County. The plan generally would continue existing uses and maximize mineral development. The Westwater Canyon WSA is managed by BLM under the Grand Resource Area RMP which allows for multiple use with certain restrictions as discussed in the description of the No Action Alternative. The Grand RMP has been reviewed by the Governor and found to be consistent with State plans.

Socioeconomics

DEMOGRAPHICS

The WSA is in north-central Grand County. The socioeconomic effects of wilderness designation or nondesignation would be spread among communities in Grand County and eastern Emery County, Utah, with some spillover into western Mesa County, Colorado.

Grand County can be characterized as rural and sparsely populated. The 1982 county population was 8,100, less than 1 percent of the State population of about 1.5 million (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). The majority of the county is unpopulated, with 97 percent of the settlement concentrated in the Moab area. About 65 percent of the county's population lives in Moab and 32 percent lives in Spanish Valley, which is adjacent to and southeast of Moab (USDC, Bureau of the Census, 1981). The land in Grand County comprises about 4.5 percent of the state, or about 3,615 square miles. About 80 percent of the county is owned by the Federal government, 15.5 percent by the State, and 4.5 percent by private landowners.

Mesa County had a 1981 population of 87,100. Grand Valley, which is in the midwestern part of Mesa County, contains 83 percent of the county's

population. Grand Junction (1980 population of 28,194) serves as a major service center for western Colorado and southeastern Utah (USDC, Bureau of the Census, 1981).

The communities nearest to the WSA are Thompson (population 200), about 30 miles southwest, and Cisco (population 45), about 15 miles south. Services are available in Thompson, but not in Cisco. Grand Junction, Colorado, is about 40 miles east of the Harley Dome exit on I-70, and Green River and Moab, Utah are about 54 and 55 miles west and southwest, respectively, of the east Cisco exit on I-70.

EMPLOYMENT

Recent statistics show that 99 percent of local wage and salary employment in Grand County is nonfarm, with about 17 percent employed in Federal, State, and local governments (USDC, Bureau of Economic Analysis, 1983). Mining and tourism are the most important private industries in Grand County. Mining directly accounts for 25 percent of local employment; however, recent minings and milling layoffs currently reduce mining's local importance. Tourism directly accounts for approximately 12 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export industries contributes to local income and employment. Including these multiplier effects, mining and tourism directly and indirectly account for 35 to 45 percent and 17 to 25 percent of local employment, respectively. Unemployment in the county is among the highest in the state with a rate of almost 18 percent (Utah Department of Employment Security, 1983). This is primarily due to large mine layoffs and the resulting downturn through the local economy. Refer to Table 10 for data concerning personal income and employment for Grand County.

Green River (population 1,048) in Emery County on the Grand County line is basically a tourism and farming community because of its location at the crossroads of U.S. Highway 6 and I-70. The mining and government sectors are also major employers in the area.

In Colorado, Mesa County's economy is well diversified with large construction, mining, retail, and service sectors. Increased mining activity and general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the recent decrease in oil shale activities, the local economy still shows some signs of growth.

WESTWATER CANYON WSA

TABLE 10
1981 Personal Income and Employment
Grand County, Utah

Industrial Sector	Income (Percent)	Employment (Percent)
Agriculture	1	1
Total Agricultural	1	1
Mining	34	25
Construction	7	5
Manufacturing	1	1
Transportation and Public Utilities	10	8
Wholesale Trade	10 ¹	8
Retail Trade	10 ¹	18
Finance, Insurance and Real Estate	3	2
Services	11 ¹	16
Other	—	—
Total Private Industry	85	82
Federal Government	5	6
State and Local Government	9	10
Total Government	14	17
Total Nonagricultural	99	99
Unemployment (1st Quarter, 1983)		18
	(Dollars)²	(Jobs)
Total Employment and Earnings	52,753	3,617
Total Personal Income	75,404	

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

¹Includes 12 percent of total income due to tourism.

²In thousands of dollars.

Note: Because of rounding, numbers are not additive. Employment percentage figures include only wage and salary employment. The relative importance of farm equipment is, therefore, underrated. Tourism is included as part of Services, Retail trade and Other.

INCOME AND REVENUES

Past activities in the WSA that could be of any local economic consequence include mineral activities, livestock production, and recreation. Table 11 summarizes local sales and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate sales and revenues.

There are 480 acres in the WSA under oil and gas lease. Thus far, no oil and gas production has occurred in the WSA. The WSA has 23 mining claims. Regulations require a \$100 per claim annual expenditure for labor and improvements. Some of these expenditures are made within the local economy.

Six livestock operators in five allotments have grazing privileges in the WSA. Based on the consumption of 545 AUMs of forage by cattle and sheep, it is estimated that the WSA accounts for \$10,900 of livestock sales, including 2,725 of ranchers' returns of labor and investment. The expenditures could be significant to local ranchers; however, they are of low significance to the local and regional economies.

TABLE 11
Local Sales and Federal Revenues

Source	Annual Local Sales ¹	Annual Federal Revenues
Mining Claim Assessment	Less than \$2,300	None
Oil and Gas Leases	None	\$1,440
Livestock Grazing	\$10,900	\$763
Recreational Use	Less than \$1,500,000	\$11,500
Total	Less than \$1,513,200	Up to \$13,703

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total local income that would be generated by these expenditures.

Current use of the Colorado River through Westwater Canyon accounts for less than 1 percent of local income but is a significant source of income for several individual sectors, particularly river outfitters. River operators based in Moab, Green River, and Grand Junction offer commercial river trips, and private users buy supplies in these towns. Particularly for Moab and Green River, sales from tourism provide an export industry that has seen steady growth. River outfitters provide a fairly stable (although seasonal) source of local employment and income (refer to Table 12). There are nine local and 10 nonlocal commercial operators that boat Westwater Canyon.

Commercial boating use directly accounts for an estimated \$1.15 million in sales by the 19 operators using the WSA. The 10 nonlocal outfitter operations contribute less to the local economy than do the nine local outfitters. Including multiplier effects, the purchases of local outfitter services and nonlocal outfitters and the local expenditures by private users account for \$460,000 of earned income and 40 jobs in Carbon, Emery, and Grand Counties. Economic effects are concentrated in (1) certain communities such as Green River, which has a employment work force of 238; and (2) certain industrial sectors such as retail and service businesses. Therefore, expenditures related to boating use of the WSA are significant to a number of local businesses.

TABLE 12
Economic Importance of Boating in Westwater Canyon
(1980 Dollars)

	Green River Utah	Grand County Utah	Mesa County Colorado
Personal Income	\$265,000	\$400,000	\$420,000
Employment (jobs)	20	30	32

Source: BLM File Data; Appendix 9.

Land-based recreation use of the WSA is low.

The WSA generates revenues to the Federal Treasury from three sources: mineral leasing, grazing fees, and recreation use permits. Within the WSA, about 480 acres are currently leased for oil and gas. At \$3 per acre, this generates up to 1,440 annually. Half of this, or about \$720, is allocated back to the State of Utah. The State then reallocates these revenues to various funds, the majority of which are related to energy development. Based on 545 AUMs of forage consumed by livestock in the WSA and a 5-year grazing fee average of \$1.40, the WSA annually accounts for \$763 of grazing fee revenues to the Treasury. One-half of this is allocated back to the local BLM District for the construction of range improvement projects.

Based on issuing an average of 11,500 user day permits annually and an average permit fee of \$1 per user day, recreation permits generate about \$11,500 of Federal revenues annually.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines For All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from: (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These esti-

mates were based on literature studies and known mining activities in the vicinity of the WSAs. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation, and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative

The major changes that could occur in the area would be related to locatable mineral exploration and development and habitat development for livestock. The area would be open to resource use and development without control for wilderness protection. The degree of future development is unknown but would probably be low due to the area's lack of resource potential. The following is a worst-case analysis, based on the assumption that minerals would be developed sometime in the future and would result in the following disturbance: manganese, 23 acres; and a burning-and-seeding project, 500 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed by the State of Utah as a PSD Class II area. Disturbance of 523 acres would result in only short-term increases in fugitive dust emissions. These emissions would be reduced as plant cover became re-established. No major sources of air pollutant emissions are proposed in the vicinity of the WSA.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with locatable minerals (i.e., manganese) exploration and development activities would probably not exceed 23 acres. The 500-acre burning-and-seeding project would also not affect the geological resource in the WSA.

SOILS

It is estimated that up to 23 acres of soil would be disturbed by mineral exploration and development. The average rate of soil loss at present is estimated at about 0.51 cubic yard/acre/year. Soil loss on disturbed acres in the WSA is estimated at 3.60 cubic yards/acre/year. Therefore, soil loss

WESTWATER CANYON WSA

on the 23 acres would increase from about 12 cubic yards/year to approximately 83 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined.

Therefore, under this alternative, maximum annual soil loss in the WSA could increase by approximately 71 cubic yards over current annual soil loss.

Burning and seeding of 500 acres would result in short-term increases in soil loss; however over a period of 3 to 5 years, soil loss would be reduced as a result of the seeding project.

VEGETATION

The anticipated maximum disturbance of 523 acres would likely not significantly impact the WSA's vegetation. The majority of the disturbance would occur in the pinyon-juniper woodland and sagebrush vegetation types and would result from the 500-acre burning-and-seeding project. A grass-shrub vegetation type would dominate the disturbed areas. Over time, these acres would revert back to original vegetation types unless the area was treated again. No disturbance of the riparian vegetation type would be anticipated.

Three species of sensitive plants are found within or near the WSA. Before authorizing surface-disturbing activities (523 acres potential), BLM would conduct site-specific clearances of potentially disturbed areas. If these species could be affected, BLM would consult with FWS as required by BLM policy (refer to Appendix 4). BLM would request a biological opinion when appropriate, as required by the Endangered Species Act (refer to Appendix 4). Because necessary measures would be taken to protect these plants, it can be reasonably concluded that the viability of populations of threatened, endangered, or sensitive plant species would be preserved under the No Action Alternative.

WATER RESOURCES

Most erosion within the WSA is natural rather than caused by human activity. Surface disturbance from mineral exploration and development would impact up to 23 acres under this alternative, with a soil loss increase of approximately 71 cubic yards per year. The Colorado River corridor is temporarily withdrawn from mineral entry, eliminating a 4,160-acre area from potential actions that would add sediment or salinity to the river.

Recreational use of the river is currently managed to minimize water quality impacts from human waste disposal. No water developments or improvements have been identified for the WSA.

Thus, impacts to surface water resources would be minimal. Because no underground disturbance related to mining activities is anticipated, no impacts to the ground water resource would be anticipated.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and gas categories in the WSA would remain the same (15,546 acres in Category 1, 820 acres in Category 2, 14,043 acres in Category 3, and 751 acres in Category 4). There would be 30,409 acres available for lease, including the 480 acres currently under lease.

The WSA is believed geologically unfavorable for an oil and gas resource, and development would not be anticipated under this alternative.

Locatable Minerals

Locatable mineral exploration and development could occur within the WSA, subject to the temporary withdrawal of 4,160 acres along the river corridor from mineral entry. If the temporary river study withdrawal is terminated by Congress, this area would also be open to mineral entry. A potential deposit of less than 100,000 tons of manganese could be developed. The WSA is geologically unfavorable for other types of locatable minerals.

Salable Minerals

No salable mineral resource is known to exist in the WSA and no development would be projected under this alternative.

WILDLIFE

Disturbance of an estimated 523 acres through mineral exploration and development and the burning-and-seeding project could disrupt wildlife. Wildlife disturbance and habitat loss would be short term while work was ongoing, and habitat actually could be enhanced over the long term by reclamation and revegetation. No loss of critical wildlife habitat would be anticipated because it is not believed that any wildlife populations would be jeopardized. The river corridor is temporarily withdrawn from mineral entry, eliminating 4,160 acres from the potential surface disturbance. The 13 miles of river corridor are considered crucial habitat for three endangered and one potentially threatened or endangered fish species and two endangered bird species. The corridor area would be protected unless the temporary withdrawal were lifted. No disturbance of the riparian vegetation type would be anticipated under this alternative.

FOREST RESOURCES

There is a limited source of trees, other than the pinyon and juniper woodland in the WSA. Occasional use by campers and hikers would continue to occur in the area. No harvest of forest products is currently occurring and none would be projected for this alternative, other than the occasional use by campers. Up to 523 acres of pinyon-juniper woodland and sagebrush would be disturbed as a result of the manganese mining and a burning-and-seeding project.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Grand Resource Area RMP. The 545 AUMs currently allocated in the WSA are controlled by six livestock permittees. Additional roads or other facilities for livestock handling could be proposed and developed in the future without regard for wilderness values. Existing range facilities (three reservoirs and several short-gap fences) could be maintained by mechanical methods. Since motorized vehicles are currently used very little to manage livestock in the WSA, few, if any, changes in livestock management techniques are expected. New rangeland developments could be implemented without wilderness considerations. A 500-acre burning-and-seeding project has been identified in the planning and would be implemented under this alternative, resulting in an increase of 63 AUMs.

VISUAL RESOURCES

Even though mitigation measures would be applied to minimize visual contrast created by intrusions, visual values in areas affected by the estimated 23 acres of surface disturbance from mineral and energy exploration and development and the 500-acre burning-and-seeding project would be degraded. Therefore, as a result of mineral exploration and development, VRM Class II management objectives would probably not be met during the short term, but would probably be met in Class IV areas. The majority of the WSA (30,160 acres) has been classified as VRM Class II. The remaining 1,000 acres have been classified as VRM Class IV. Even after rehabilitation, some permanent localized degradation would be expected on about 23 acres. VRM Class II management objectives would also probably not be met on the 500-acre burning-and-seeding project. This intrusion would probably be visible and exceed Class II management objectives until the treated areas returned to natural vegetation. The intrusion could be considered permanent if the manipulated area were regularly maintained and

would affect visual resources on about 1.6 percent of the WSA.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 23 acres of surface disturbance by mineral exploration and development and 500 acres of burning and seeding under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in disturbed areas. There are no known National Register sites within the WSA; however, some of the 13 known sites are believed to have National Register potential.

RECREATION

About 17,570 acres would remain open for vehicular use in accordance with the RMP. About 5,510 acres would be limited to ORV use of existing roads and trails, and about 8,080 acres would be closed to ORV use when these designations are implemented. The limited use and closed areas are adjacent to the Colorado River. Approximately 2 miles of trail to Miner's Cabin would be closed.

Up to 523 acres could be disturbed by mineral and energy activities and the burning-and-seeding project. Primitive recreational opportunities would be diminished on these affected areas. The burning-and-seeding project would also have short- and long-term impacts on sightseeing and primitive recreation because of the effects of intrusions on scenic and primitive values.

River recreation visitor use would not exceed 14,000 visitor days. Current use is about 11,500 visitor days. Other types of recreation opportunities (i.e., fishing, hunting, ORV use) would be expected to increase in popularity in relation to State population increases. Based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent/year over the next 20 years. Based on this projection, annual nonwater-based recreation in the WSA would increase from 210 visitor days to 388 visitor days over a 20-year period.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the Grand Resource Area RMP. Potential mineral exploration and development could disturb an estimated 23 acres. An additional 500 acres would be dis-

WESTWATER CANYON WSA

turbed by a burning-and-seeding project. Wilderness values in this WSA (i.e., naturalness, opportunities for solitude and primitive recreation, and special features) could be lost or diminished in affected areas. The 500 acres of vegetation treatment would be in an area that lacks outstanding opportunities for solitude or primitive and unconfined recreation and would, therefore, not affect those values.

A .25-mile-wide corridor on each side of the river would remain temporarily withdrawn from mineral location, mining and other uses, except mineral leasing. Also, 30,160 acres would be managed under VRM Class II objectives requiring that activities not be apparent.

LAND USE PLANS AND CONTROLS

Land use plans dealing with the area encompassed in the WSA are the *Grand County Master Plan* and the BLM Grand Resource Area RMP. Implementation of this alternative would not change the present or expected use of the lands in the WSA and would be consistent with the multiple-use concept of those plans. This alternative would also be consistent with the management philosophy of the State of Utah which emphasizes economic return from State school sections.

SOCIOECONOMICS

There would not be a loss of local employment or income as a result of this alternative. The existing ability to explore and develop mineral resources would remain as at present. If the manganese resource in the WSA were developed it would not lead to a significant increase in employment and income for Grand County. The probability of economic development of minerals within the WSA is low (refer to the Mineral and Energy Resources section for a description of mineral and development potentials).

There would be no livestock-related economic losses because the existing grazing use (545 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The 500-acre burning-and-seeding project that would produce 63 AUMs of new allocated forage could lead to \$1,260 of livestock sales, including \$315 of ranchers' returns to labor and investment.

As discussed in the Recreation section, water-based recreation in Westwater Canyon is governed by a management plan. Recreation use in the canyon would not be expected to increase under this alternative. Personal income and sales would continue to average approximately

\$1,500,000 annually while providing 82 seasonal jobs. Nonwater-based recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase only 178 visitor days per year over the next 20 years and overall recreation-related expenditures average only \$4.10 per visitor day (only a portion of which contributes to the local economy), recreation-related expenditures attributable to the WSA would likely not be significant to the local economy.

Federal and State revenues would not be reduced by this alternative. There are 29,929 acres in the WSA open to oil and gas leasing that are currently not leased. If leased they would bring up to \$89,787 additional Federal lease fee revenues per year in addition to new royalties from lease production and bonus bids from new leases in Known Geologic Structures (KGSs). Half of these monies would be allocated to the State, a portion of which could reach the local economy. The probability of oil and gas development in the WSA is very low due to unfavorable geologic conditions, and little interest in leasing has been expressed. Collection of livestock grazing fees (\$763 per year) would continue. The additional 63 AUMs that would be produced by the burning-and-seeding project and allocated to livestock under this alternative would increase Federal revenues by \$89 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range improvement projects.

All Wilderness Alternative (31,160 Acres)

As noted in the Description of the Alternatives section, the major changes that could occur in the 31,160-acre area would be related to its closure to new mineral location, leasing, and sale. The WSA would be placed in oil and gas leasing Category 4 (closed to leasing). About 22.5 miles of existing vehicular ways in the WSA would be closed to vehicular use, except for approvals by BLM as discussed in the Description of the Alternatives section. The WSA would be managed under VRM Class I and would also be closed to ORV use.

For the following analysis, it is assumed that existing mining claims would eventually be explored and developed, causing an estimated 23 acres of disturbance within the WSA. It is also assumed that existing oil and gas leases would expire before production of commercial quantities. Oil and gas leases would not be renewed and future

leasing of oil and gas would not be allowed. The 500-acre burning-and-seeding project would not be allowed. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

Because potentially disturbed areas would be smaller than under the No Action Alternative (23 vs. 523 acres), the impacts from development and surface disturbance on air quality, geology, soils, vegetation, water, forest, and cultural resources would be insignificant for the All Wilderness Alternative. Wilderness designation would provide additional protection to these resources. Other effects on these resources due to changes in management are discussed below.

WATER RESOURCES

Restraints on mineral development would protect water quality. The potential for increased soil erosion and sediment yield from 23 acres of mineral-related disturbance would be as discussed under the No Action Alternative. However, under this alternative, possible benefits to the watershed from the 500-acre burning-and-seeding project would be foregone. Improvements or expansion of existing waters could not occur.

Exploration for and development of potential manganese deposits in the area would be generally confined at or near the surface and would not be expected to significantly alter ground water flow or reduce ground water quality.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

No exploration or development of oil and gas is presently occurring within the WSA. The existing lease could be developed subject to the stipulations issued at the time of leasing. However, it has been assumed that the existing lease will not be developed nor a showing of commercial quantities made prior to its expiration date. Expired leases would not be reissued. New leasing would not be allowed.

Because the WSA is believed to be geologically unfavorable for the occurrence of oil and gas, implementation of this alternative would likely not result in a significant loss of potential oil and gas resource. No other leasable resources are known to exist in the WSA.

Locatable Minerals

Approximately 1,805 acres are under mining claim within the WSA, principally for placer deposits. Less than 100,000 tons of 40-percent manganese are estimated to occur within the WSA

and could be developed under a lode claim. Development work, extraction, and patenting would be allowed to continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. The greatest loss of manganese would occur if the reserves are not within claims filed prior to designation. In that case the potential for recovery of a small deposit of manganese would be foregone and the entire 31,160 acres would be closed to claim location. The potential loss of other locatable minerals is very low within the WSA.

Salable Minerals

No salable mineral resource is known to exist in the WSA and no development would be projected under this alternative.

WILDLIFE

Under this alternative, wildlife could not benefit from vegetation enhancement or development of facilities in the future because these projects could be prohibited to protect wilderness values. No facilities or vegetation treatments have been proposed for this WSA. Disturbance of an estimated 23 acres through mineral exploration and development would likely not disrupt wildlife. Adverse impacts (if any) would be short term while work was ongoing, and habitat would be restored over the long term by reclamation and revegetation. Approximately 4,160 acres along the river (13 miles in length) are considered crucial habitat for three endangered or proposed endangered or threatened fish species, one fish species under status review by FWS, and two endangered raptor species. Presently, this acreage is protected from mineral entry. However, the withdrawal is temporary and awaiting designation of the river as a Wild and Scenic River segment. Wilderness designation would ensure the protection of this segment of river from disturbance that could affect threatened and endangered species habitat..

LIVESTOCK

Present domestic livestock grazing would continue as authorized in the Grand Resource Area RMP. The 545 AUMs currently allocated in the WSA are controlled by six livestock permittees. Existing developments (three stock reservoirs and several short-gap fences) would be used and maintained in the same manner as the past, based on practical necessity and reasonableness. New range developments would be allowed on a case-by-case basis if necessary for resource protection (range and/or wilderness) and the effective management of these resources, provided that wil-

derness protection standards are met. The 500-acre burning-and-seeding project that would result in an increase of 63 AUMs would not be allowed. Future roads or other livestock management facilities could be restricted to protect wilderness values, although none have been proposed. Overall, there would be no significant changes in livestock management in the WSA.

VISUAL RESOURCES

Wilderness designation would contribute to the preservation of the area's visual resources. Under this alternative, the potential for surface-disturbing activities that could impair visual quality would be reduced through VRM Class I management guidelines (which generally allow for only natural ecological change), through the ORV closure, and through closure of the entire area to future mineral leasing and location.

Under this alternative, disturbance from a 500-acre burning-and-seeding project would not occur. Possible mineral-related disturbance would be 23 acres associated with development of valid mining claims. Although mitigating measures would be applied to reduce visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. Because the potential for development of mining claims is low and disturbance would not exceed 23 acres, visual quality would not be reduced in the WSA as a whole.

RECREATION

River use in Westwater Canyon, which is managed according to the Westwater Canyon River Management Plan, would not substantially increase over carrying capacity levels of about 14,000 visitor days annually. This use includes both private and commercial use.

As discussed for the No Action Alternative, nonwater-based recreational use of the WSA is estimated to increase about 2 percent per year over the next 20 years in relation to population increases and current trends of recreational use. Publicity of the WSA that would likely follow wilderness designation could lead to an increase in primitive recreational use above the baseline rate. Judging from use densities of a number of well known wilderness areas, proposed wilderness areas, and primitive areas in the region; the WSA's site characteristics; the population distribution about the WSA; and the availability of similar sites, it is estimated that, following designation,

use could be as much as 3,116 nonwater-based visitor days per year (USDI, BLM, 1985). This is 2,856 visitor days over the area's current estimated 260 annual visitor days of nonwater-based recreation. Estimated overall recreation use (including water-based use) is predicted to increase to 17,116 visitor days per year. Management provided through a Wilderness Management Plan would control destructive increases in future recreation use, and the quality of the primitive recreation experience probably would not be negatively affected by the increased use. The 60 visitor days of ORV play activity in the WSA that could occur without designation would be eliminated from the WSA. Because there are other suitable ORV play areas in the vicinity of the WSA, ORV use would probably not experience an overall decline in the vicinity of the WSA.

The 22.5 miles of vehicular ways in the WSA would be closed to use. These ways are used primarily for mine claim and hunting access.

If roads for the development of valid mining claims could not be denied, the quality of primitive recreational opportunities would be reduced. However, because the potential for mineral production is low, the quality of the primitive recreational experience would likely be preserved.

WILDERNESS VALUES

Wilderness designation would contribute to the preservation of the area's wilderness characteristics. Under this alternative, the potential for surface-disturbing activities that could impair wilderness values would be reduced through management under VRM Class I (generally allowing for only natural ecological change), through an ORV closure, and through closure of the entire WSA to future mineral leasing and location. Also, the 500-acre burning-and-seeding project would not occur.

No development of oil and gas leases is foreseen under this alternative. The possible mineral-related surface disturbance would be 23 acres for development of valid mining claims. Mitigation to protect wilderness values would be considered during mining claim development, but road construction and use of motorized equipment could be allowed. There are 1,805 acres of the WSA (.06 percent) under mining claims; thus, naturalness, solitude, and primitive recreation opportunities on the affected areas could be reduced until satisfactory reclamation is completed. However, the potential for mineral development is low.

The WSA is natural in character and contains approximately 20,600 acres with outstanding

opportunities for solitude. River recreation use along the Colorado is high, with user numbers controlled by BLM management objectives in the river management plan. Campsites are assigned to eliminate crowded conditions and impacts within the limited area. Solitude along the river is not always available, especially during peak use. The remainder of the WSA provides outstanding opportunities for recreationists to hike, camp, hunt, fish, or view wildlife. Under this alternative, these outstanding opportunities would be preserved. Special features (i.e., the Wild and Scenic River proposal, wildlife, and geologic specialties) would also be protected.

LAND USE PLANS AND CONTROLS

If State lands within the WSA are purchased or exchanged for lands outside the WSA, wilderness designation would not conflict with the policy of the State of Utah to maximize economic returns. The BLM Grand Resource Area RMP does not provide for wilderness designation of the Westwater Canyon WSA. Congressional designation of the WSA as wilderness would be an amendment to the RMP. Designation would not be totally consistent with the *Grand County Master Plan* which favors maximizing mineral development and maintaining existing uses. Most existing uses would continue but leasing for oil and gas or other minerals would be prohibited.

SOCIOECONOMICS

Overall there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from being established in the WSA. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. Because the potential for mineral development is low, it is estimated that poten-

tial mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$10,900 of livestock sales, including \$2,725 of ranchers' return to labor and investment. Proposed improvements for livestock would be foregone, along with any resulting increase in ranchers' income. A 500-acre burning-and-seeding project has been proposed. Loss of this project would result in the loss of a potential 63 AUMs and \$315 in ranchers' returns to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average of \$4.10 per visitor day statewide). Motorized recreational use of the WSA is light. The decrease in related local expenditures would be small and insignificant to both the local economy and individual businesses.

The loss of 480 acres now leased would cause an eventual loss of up to \$1,440 per year of lease fees to the Federal Treasury. There would also be a potential loss of \$89,787 annually in Federal revenues from the 29,929 acres that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production could also be foregone. However, it should be noted that the likelihood of oil and gas development in the WSA is very low.

If the proposed range improvements are not developed and used, an estimated annual \$189 of Federal grazing revenues from 63 increased AUMs would be foregone.

Wilderness designation would eliminate woodland product harvesting and related Federal revenues. However, there is no potential for woodland harvest in the WSA.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues would not increase as commercial use of Westwater Canyon is regulated by a management plan and use is already near maximum levels allowed.

Partial Wilderness Alternative (26,000 Acres) (Proposed Action)

The major activities that would occur in the designated portion of the WSA for this alternative

are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 26,000-acre area designated as wilderness and the 5,160-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that, in the designated area, some of the existing mining claims would eventually be explored and developed, causing an estimated 19 acres of disturbance. It is also assumed that existing oil and gas leases in the designated portion would expire before production of commercial quantities. Oil and gas leases would not be renewed.

It is assumed that, within the nondesignated area, only 4 acres would be disturbed sometime in the future due to mineral exploration and development. The 500-acre burning-and-seeding project would also be located in the nondesignated portion of the WSA and, therefore, would be allowed under this alternative.

Overall, 523 acres of surface disturbance would occur within the designated and nondesignated portions of the WSA, the same amount analyzed under the No Action Alternative. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates for the WSA.)

The analysis of the No Action Alternative, based on 523 acres of surface disturbance from mineral exploration and development and the burning-and-seeding project, shows that full development of potential resources with associated surface disturbance would not significantly affect air quality, geology, soils, vegetation, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative, which assumes the same amount of surface disturbance.

Restrictions on management and development methods within the WSA would result in essentially the same impacts on air quality, soils, water sources, mineral and energy resources, wildlife, livestock, visual resources, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences between the Partial Wilderness, No Action, and All Wilderness Alternatives.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Anticipated impacts would be similar to the All Wilderness Alternative, except 5,160 additional

acres would be available for less restrictive conventional oil and gas production. Implementation of this alternative would have little effect on pre-FLPMA leases in the designated area. Development is not expected on these leases due to unfavorable geologic conditions for oil and gas.

The 26,000-acre area that would be designated wilderness under this alternative would be placed in Category 4 status with no new leasing. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

Within the 5,160-acre nondesignated portion of the WSA, the oil and gas leasing categories would remain the same: 4,220 acres in Category 1 (open with standard stipulations), 820 acres in Category 2 (open with standard and special stipulations), and 120 acres in Category 3 (no surface occupancy). The wilderness stipulation on post-FLPMA leases would be lifted and the area could be explored or developed without concern for wilderness values. There are approximately 290 acres of pre-FLPMA oil and gas leases in the area that would not be designated wilderness.

In conclusion, the WSA is believed to be geologically unfavorable for an oil and gas resource to occur. Thus, there would be no resource foregone in the designated area.

Locatable Minerals

Approximately 1,805 acres of mining claims fall within the area that would be designated wilderness. Development work, extraction, and patenting could continue on valid claims after wilderness designation under unnecessary or undue degradation guidelines. After designation, all other lands (including claims not determined valid) would be closed to prospecting and development (USDI, BLM, 1981a).

It cannot be determined how much of the potential 100,000 tons of manganese in the WSA falls within the area that would be designated as wilderness under this alternative. Assuming that the locatable minerals are evenly distributed in the WSA and that the mineral deposits were not included in mining claims filed before designation, the potential for development of 82,000 tons of manganese would be foregone (18,000 tons less foregone than with the All Wilderness Alternative).

Because this metal is not being recovered at present within the WSA, there is a lack of potential for any other types of metals, and economic considerations (e.g., poor access, rough terrain, etc.) are unfavorable, it is unlikely that exploration or development will occur. In conclusion, imple-

mentation of this alternative would not prevent recovery of significant amounts of locatable minerals.

Salable Minerals

No salable mineral resource is known to exist in the WSA and no development would be projected under this alternative.

WILDLIFE

Under this alternative impacts to wildlife in the designated portion would be similar to those described in the All Wilderness Alternative. No projects that could improve wildlife habitat would be allowed. None are planned in the designated portion of the WSA. The 19 acres of surface disturbance (mineral exploration and development) would result in short-term wildlife disturbance while work was ongoing. Habitat would be restored by reclamation and revegetation. The crucial endangered species habitat in the Colorado River would be maintained.

In the 5,160-acre nondesignated portion, the 500-acre burning-and-seeding project would reduce livestock and wildlife competition and improve wildlife habitat over the long term. The 4 acres of surface disturbance associated with mineral exploration and development would not be expected to adversely affect wildlife habitat in the area.

LIVESTOCK

Partial wilderness designation would affect livestock grazing essentially the same as the All Wilderness Alternative. Of the 545 AUMs allocated, 520 would be within the designated portion of the WSA and 25 within the nondesignated portion. Development of future roads or other livestock management facilities for use with 520 AUMs in the designated portion could be restricted to preserve wilderness values. In the 5,160-acre non-wilderness area, livestock grazing and support facilities would be allowed without wilderness considerations if in conformance with the Grand RMP. In this area, the 500-acre burning-and-seeding project could be implemented, resulting in an increase of 63 AUMs.

VISUAL RESOURCES

Wilderness designation of 26,000 acres would contribute to the preservation of the area's visual resources. The potential for surface-disturbing activities that could impair visual quality would be reduced through VRM Class I management guidelines (which generally allow for only natural ecological change), through the ORV closure, and through closure of the area to future mineral leasing and location.

Mineral-related disturbance (19 acres) could reduce visual quality, and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation, some permanent localized degradation could be expected. The potential for mineral development is low and, even if developed, only 19 acres would be disturbed. Therefore, visual quality of the designated portion of the WSA would not be reduced areawide.

The 5,160-acre nondesignated portion of the WSA would continue to be managed as VRM Classes II and IV. The 4 acres of anticipated mineral-related disturbance and 500-acre burning-and-seeding project would not meet VRM Class II objectives. Class IV objectives could be met. The probability of mineral development is extremely low in the Westwater Canyon WSA.

RECREATION

River use (both commercial and noncommercial) would continue as described for the All Wilderness and No Action Alternatives. Use would not exceed 14,000 visitor days annually as directed by the river management plan.

The entire 26,000 acres designated as wilderness would be closed to recreational ORV use. About 10 miles of trails and traveled ways would be closed as compared to 22.5 miles under the All Wilderness Alternative. These routes account for about 30 visitor days per year of recreational and mineral exploration use. Increased primitive recreation use as a result of publicity from wilderness designation could account for up to 2,600 visitor days per year. Of the 5,160 acres not designated as wilderness, about 350 acres would have ORV use limited to existing roads and trails, and the remaining 4,810 acres would remain open (30 visitor days annually).

Primitive recreation values within the designated portion would be as described under the All Wilderness Alternative. In the 5,160 acres that would not be designated, little change in primitive recreational values is expected due to the limited values present.

WILDERNESS VALUES

Impacts to wilderness values would be the same as under the All Wilderness Alternative on the 26,000 acres that would be designated wilderness. Size, naturalness (all 26,000 acres), outstanding opportunities for solitude (20,600 acres) and primitive recreation (7,760 acres), and special features would be preserved.

The possible surface disturbance of 19 acres on the designated area and 4 acres on the nondesignated

nated area would be related to mineral exploration and development. Mitigation to protect wilderness values on 19 acres would be considered during claim development, but road construction and use of motorized equipment could be allowed if there were no reasonable alternatives. The possibility for such exploration or development is low due to the lack of locatable mineral deposits and restrictive and rough terrain. Also, a .25-mile-wide corridor exists along the Colorado River for temporary withdrawal of mineral entry. Protection of this area would continue under this alternative.

On the 5,160 acres not designated, the outstanding opportunities for solitude and primitive and unconfined recreation are not present. Thus, impacts to these values would not occur.

LAND USE PLANS AND CONTROLS

The relationship of the 26,000-acre designated portion of the WSA to existing land use plans would be the same as discussed in the All Wilderness Alternative. The relationship of the 5,160-acre nondesignated portion of the WSA would be as discussed for the No Action Alternative.

SOCIOECONOMICS

Overall there would be no significant changes in current trends of population, employment, and local income distribution.

Because of restrictions placed on the use of resources under wilderness designation, there could be slight losses in local income and Federal revenues currently provided by resource uses in the WSA (refer to Table 11) as well as loss of potential increases in income and Federal revenues that could occur under the No Action Alternative.

The potential for mineral development in the WSA is low (refer to the Mineral and Energy Resources section for a discussion of the WSA's mineral character). Valid existing oil and gas leases and mining claims could be developed but designation would preclude new leases and claims from

being established in the WSA. New leases and claims could be developed in the 5,160-acre non-designated portion. Precluding exploration and development of minerals would not alter existing economic conditions, but could alter future economic conditions from what they would be with mineral development under the No Action Alternative. It is estimated that potential mineral-related local income would not be significantly reduced by wilderness designation. However, any local income related to assessment of future mining claims would be lost.

Livestock use and ranchers' income would continue as at present with \$10,900 of livestock sales, including \$2,725 of ranchers' return to labor and investment. Five hundred acres of burning and seeding have been proposed for the nondesignated portion of the WSA and would be allowed under this alternative, resulting in an increase of 63 AUMs and an additional \$315 of ranchers' returns to labor and investment.

Increased public awareness of the area resulting from designation could increase nonmotorized recreational use (refer to the Recreation section). Related local expenditures would be small (average \$4.10 per visitor day statewide).

The loss of 190 acres of oil and gas leases in the designated area would cause an eventual loss of about \$570 of revenue per year to the Federal Treasury. There would also be a potential loss of \$75,177 in Federal oil and gas lease fees from the 25,059 acres in the designated part that could be leased without designation. In addition to these rental fees, any potential royalties from new lease production could also be foregone.

No existing rights-of-way or permits would be eliminated through wilderness designation.

Recreation-related Federal revenues would remain essentially as at present because commercial water-based use of the canyon is regulated by a river management plan and use is near maximum levels.

BIBLIOGRAPHY

- Aerocomp, Inc. 1984. *Final Air Quality Analysis for the Combined Hydrocarbon Environmental Impact Statement, Eastern and South-Central Utah*. March 1984. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Utah State Office, Salt Lake City, Utah.
- Brinkerhoff, Ronda. 1983. "Selected Business Statistics, Utah Counties." *Utah Economic Business Review*. March 1983. Salt Lake City, Utah.
- Centaur Associates, Inc. 1979. "Socioeconomic Impacts on Social-Cultural Values of Potential Wilderness Area Designations in Utah." July 1979. Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Prepared for the Utah Division of Parks and Recreation, Department of Natural Resources, Salt Lake City, Utah.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C. 32 pp.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Hansen, David. 1985. "Soil Erosion Information" (unpublished document). January 1985. Moab District Office, Moab, Utah.
- Hawley, C. C.; Robeck, R. C.; and Dyer, H. B. 1968. *Geology, Altered Rocks and Ore Deposits of the San Rafael Swell, Emery County, Utah*. U.S. Government Printing Office, Washington, D.C.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. December 1979. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- Milton, Bob. 1982. "Comparison of Uses in Proposed and Existing Wilderness Areas" (unpublished document). January 1982. U.S. Department of the Interior, Bureau of Land Management, Moab District Office, Moab, Utah.
- Ninety-Fourth Congress of the United States. 1976. *Federal Land Policy and Management Act*. Public Law 94-579. U.S. Government Printing Office, Washington, D.C.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by the Bureau of Land Management*. October 1, 1982. U.S. Department of Energy, Oak Ridge, Tennessee.
- Sigura, Ray and Kitcho, C. C. 1981. "Collapse Structures in the Paradox Basin." *Geology of the Paradox Basin: Rocky Mountain Association of Geologists. 1981 Field Conference*. Denver, Colorado. pp. 35-45.
- Thornbury, W. D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc. New York, New York. 690 pp.
- University of Utah, Bureau of Community Development. 1979. *Grand County, Utah: A Master Plan for Development*. October 1979. Salt Lake City, Utah.
- University of Utah, Bureau of Economic and Business Research. 1982. "Utah Economic and Business Review." Volume 4, No. 6. January 1982. Salt Lake City, Utah. 15 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1982. *Grand County Soil Survey*. June 1982. Salt Lake City, Utah.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing, Utah*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System Employment by Type and Broad Industrial Sector*. April 1983. Bureau of Economic Analysis, Regional Economics Division, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1972. "Dolores Planning Unit,

WESTWATER CANYON WSA

- Unit Resource Analysis" (unpublished document). January 12, 1972. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1974. "Dolores Planning Unit Management Framework Plan" (unpublished document). June 1, 1974. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1975. "Moab District Oil and Gas Categories Environmental Analysis Report" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1977. *The Effects of Surface Disturbance on the Salinity of Public Lands in the Upper Colorado River Basin*. Prepared by R.G. Bentley Jr. et al. Contract No. BLM/VA.XR-78/01. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1979a. "Dolores Habitat Management Plan" (unpublished document). November 1979. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1979b. *Interim Management Policy and Guidelines for Land Under Wilderness Review*. December 12, 1979. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981a. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1981. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1981b. "Soil-Vegetation Inventory Method Data for Grand Resource Area" (unpublished document). December 1981. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1982a. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on Public Lands." *Federal Register* Notice. Vol. 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982b. *Utah Southwestern Coal Region Round Two Draft Environmental Impact Statement*. March 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Grand Resource Area Proposed Management Plan Final Environmental Impact Statement*. December 6, 1983. Grand Resource Area, Moab, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1984. *Scoping the Utah Statewide Wilderness Environmental Impact Statement—Public Scoping Issues and Alternatives*. July 1984. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Wilderness Study Area Potential Use Estimates" (unpublished document). Moab District Office, Moab, Utah.
- U.S. Department of the Interior, Fish and Wildlife Service. 1983. "Endangered and Threatened Wildlife and Plants, Supplement to Review of Plant Taxa for Listing; Proposed Rule." *Federal Register* Notice. November 28, 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States* (map). Reston, Virginia.
- Utah Department of Employment Security. 1981. *Labor Market Information—Southeastern District*. May 1981. Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. *Labor Market Information—Southeastern District*. May 1983. Salt Lake City, Utah.
- Utah Department of Transportation. 1984. *Travel Analysis for 1981*. May 1984. Transportation Planning Division in cooperation with the Utah Department of Transportation, Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Recreation Plan, 1980 SCORP* Salt Lake City, Utah.
- Washburn, Randy F. and Cole, David. 1981. "Problems and Procedures of Wilderness Management; A Comprehensive Summary of a Survey of Management in National Wilderness Preservation System and Likely

Additions" (unpublished document). February 2, 1980. U.S. Department of Agriculture, Northwestern Forest Service Experiment Station, Washington.

Winter Ridge WSA



WINTER RIDGE WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	3
Alternatives Considered and Eliminated from Detailed Study	3
Alternatives Analyzed	3
No Action Alternative (Proposed Action)	3
All Wilderness Alternative	5
Partial Wilderness Alternative	7
Summary of Environmental Consequences	10
AFFECTED ENVIRONMENT	10
Air Quality	10
Geology	10
Soils	13
Vegetation	13
Water Resources	14
Mineral and Energy Resources	14
Wildlife	17
Forest Resources	17
Livestock and Wild Horses/Burros	17
Visual Resources	18
Cultural Resources	18
Recreation	19
Wilderness Values	19
Land Use Plans and Controls	21
Socioeconomics	21
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	23
Analysis Assumptions and Guidelines for All Alternatives	23
No Action Alternative (Proposed Action).....	24
All Wilderness Alternative	28
Partial Wilderness Alternative	31
BIBLIOGRAPHY	35

WINTER RIDGE WSA

(UT-080-730)

INTRODUCTION

General Description of the Area

The Winter Ridge Wilderness Study Area (WSA) consists of 42,462 acres of public land in the Book Cliffs Mountains in southern Uintah County, Utah. The Winter Ridge WSA is about 60 miles due south from the community of Vernal, Utah.

Major features include Winter Ridge and Main Canyon. The WSA is on Uncompaghre Plateau along the southern edge of the Uinta Basin, and it is generally located between Willow Creek on the west and Seep Ridge on the east. The Seep Ridge Road provides the major access to this part of the Uinta Basin. The Uinta Basin is the scene of considerable energy development with oil and gas production, oil shale and tar sand projects, and a coal-fired powerplant.

Within 3 miles to the west of the WSA is the Hill Creek Extension of the Uintah and Ouray Indian Reservation. That portion of the reservation is managed essentially as a natural or primitive area. Vegetation in the WSA and vicinity is primarily pinyon-juniper forest intermixed with sagebrush.

The southern part of the Uinta Basin is primarily Federal land administered by the BLM. Interspersed are an average of four State sections per township, as well as a large State block to the south of Winter Ridge. A small percentage of the land is privately owned, either by livestock interests or energy companies.

Elevations range between 5,700 and 7,600 feet. The climate of the region is semi-arid to arid. Because of the typically dry atmosphere, bright, sunny days and clear nights frequently occur. Temperatures range from 97 degrees Fahrenheit (F) in the summer to as low as -15 degrees F in December and January. Precipitation averages 12.5 inches.

Specific Issues Identified In Scoping

General issues pertaining to the WSAs are discussed in Volume I. Twelve specific comments pertaining to the Winter Ridge WSA were identified through the public scoping process (USDI, BLM, 1984b) and are responded to below:

1. *Comment:* An in-depth plant inventory should be conducted to confirm the presence of threatened and endangered species and provide a more complete picture and understanding of plant species and ecology in the Book Cliffs region.

Response: The Book Cliffs Resource Area has been inventoried for endangered, threatened, and sensitive plants. No such plants were found in the Winter Ridge WSA, although there is potential habitat in part of the WSA for four sensitive species.

2. *Comment:* The presence of endangered species represents a special opportunity for sightseeing, photography, and study.

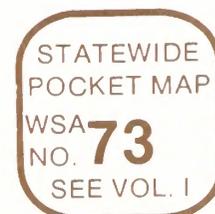
Response: No endangered plant species are known to exist in the WSA, and no endangered animal species are known to reside permanently in the WSA. The endangered bald eagle and peregrine falcon occasionally pass across the area during spring and fall migration; however, the WSA has no particular attribute that would provide a special or increased opportunity to view these species. A sensitive species, the golden eagle, may be observed in the area.

3. *Comment:* Wilderness character has been impaired in a portion of the WSA because of oil and gas exploration. This should be addressed in the Site-Specific Analysis (SSA).

Response: The effect of oil and gas development relative to the WSA is addressed in the analysis (refer to Mineral and Energy Resources sections under Environmental Consequences of Alternatives).

4. *Comment:* Pre-FLPMA (Federal Land Policy and Management Act) leases can be developed without degrading wilderness values.

Response: Oil and gas leases issued prior to October 1976 do not have requirements to protect wilderness values. Development of such pre-FLPMA leases occurs under the provisions of prior and existing rights, without wilderness protection stipulations; therefore, some wilderness values may be affected.



WINTER RIDGE WSA

5. *Comment:* Outstanding opportunities exist on over 73 percent of the area. This area qualifies for wilderness, and the Partial Wilderness Alternative is viable.

Response: The Winter Ridge area was rated as a WSA during the inventory phase of the wilderness review process. It was not originally listed by BLM, but was later added on the basis of an appeal. This Environmental Impact Statement (EIS) presents further analysis of the area. At this time, BLM does not believe that the Winter Ridge WSA is suitable for designation as wilderness; however, Congress will make the ultimate determination on its viability for wilderness.

6. *Comment:* The BLM *Interim Management Policy* (USDI, BLM, 1980) was violated frequently while the WSA was under appeal. It appears that those impairments will be used as the rationale to find the WSA unsuitable.

Response: Activities that occurred in the WSA were associated with pre-FLPMA leases, wherein the lessee had prior and existing rights to develop without wilderness protection (nonimpairment stipulations). During EIS scoping, BLM presented a preliminary indication of areas considered suitable or unsuitable for wilderness designation. For each WSA, this was based on site-specific analysis drafted in one of the five Utah BLM districts. The indication of suitability was made public prior to the EIS in order to obtain further input which has assisted in the formulation of the EIS alternatives. Additional input is expected as a result of the public review and comment on the Draft EIS. At the conclusion of the EIS process, BLM will review and consider all of the information received and at that time will formulate a final recommendation of areas found suitable for wilderness designation. Rationale for such recommendations will be included in a Wilderness Study Report to be submitted to the Secretary of the Interior and, subsequently, to Congress. The rationale will be keyed to the criteria of the "Wilderness Study Policy" (USDI, BLM, 1982) and to other resource management factors generally as described in Chapter 2, Volume I of this EIS.

7. *Comment:* Impairment during the appeal period leaves only the western and northwestern portions of the WSA as a manageable contiguous unit. Either the impairments should be reclaimed or the boundary adjusted to exclude the areas. No serious consideration of boundary adjustments was evident in the SSA.

Response: A boundary adjustment was not considered because the potential conflict between wilderness and development of hydrocarbon resources affects essentially the entire WSA.

8. *Comment:* Wording of the SSA indicates proposed developments are a foregone conclusion.

Response: Development is expected to continue to occur on pre-FLPMA leases under prior and existing rights where commercial quantities of oil or gas are found. This is especially pertinent in the Winter Ridge WSA because of the known hydrocarbon resources in the Uinta Basin.

9. *Comment:* The existence of the leases does not prove that oil exploration or production will actually occur on those tracts.

Response: In many areas, existing leases are not developed; however, the Winter Ridge WSA has a very high potential for lease development due to the proximity of known hydrocarbon resources.

10. *Comment:* Had BLM enforced nonimpairment criteria, the recreation opportunities, now down-rated by the BLM, would be as high as ever.

Response: Nonimpairment criteria are not applicable to, nor enforceable on, pre-FLPMA leases. Holders of such leases have exploration and development rights that were in effect prior to the wilderness review mandate.

11. *Comment:* While the SSA states the WSA lacks naturalness, most imprints are admitted to lie almost exclusively in Main Canyon. This data justifies the Partial Alternative but not unsuitability for the entire WSA.

Response: The analysis notes the differences between the All Wilderness Alternative and the Partial Wilderness Alternative. These differences are summarized in Table 1.

12. *Comment:* The oil and gas potential of the Winter Ridge WSA is ranked moderate to high by Science Applications, Inc. (SAI, 1982). Based on proprietary information, representatives of the oil and gas industry believe the potential of this WSA to be high. This information should be considered in the Draft EIS.

Response: At this time BLM has not made an independent assessment of geologic information gathered by oil and gas companies.

The SAI (1982) report will be used as the reference on oil and gas potential for this EIS, but information provided by the oil and gas industry and available mineral investigation reports by the USDI, Geological Survey and Bureau of Mines will be reviewed by BLM prior to making final wilderness recommendations to the Secretary of the Interior.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

No alternatives were identified for this WSA during scoping other than those analyzed.

Alternatives Analyzed

Three alternatives are analyzed for this WSA: (1) No Action; (2) All Wilderness (42,462 acres); and (3) Partial Wilderness (28,044 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

NO ACTION ALTERNATIVE (PROPOSED ACTION)

Under this alternative, none of the 42,462-acre Winter Ridge WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Book Cliffs Resource Management Plan (RMP)(USDI, BLM, 1984c). The four sections (2,561.44 acres) of State land within the WSA (refer to Map 1) have not been identified in the RMP for special Federal acquisition through exchange or purchase. State lands are analyzed as remaining under State ownership.

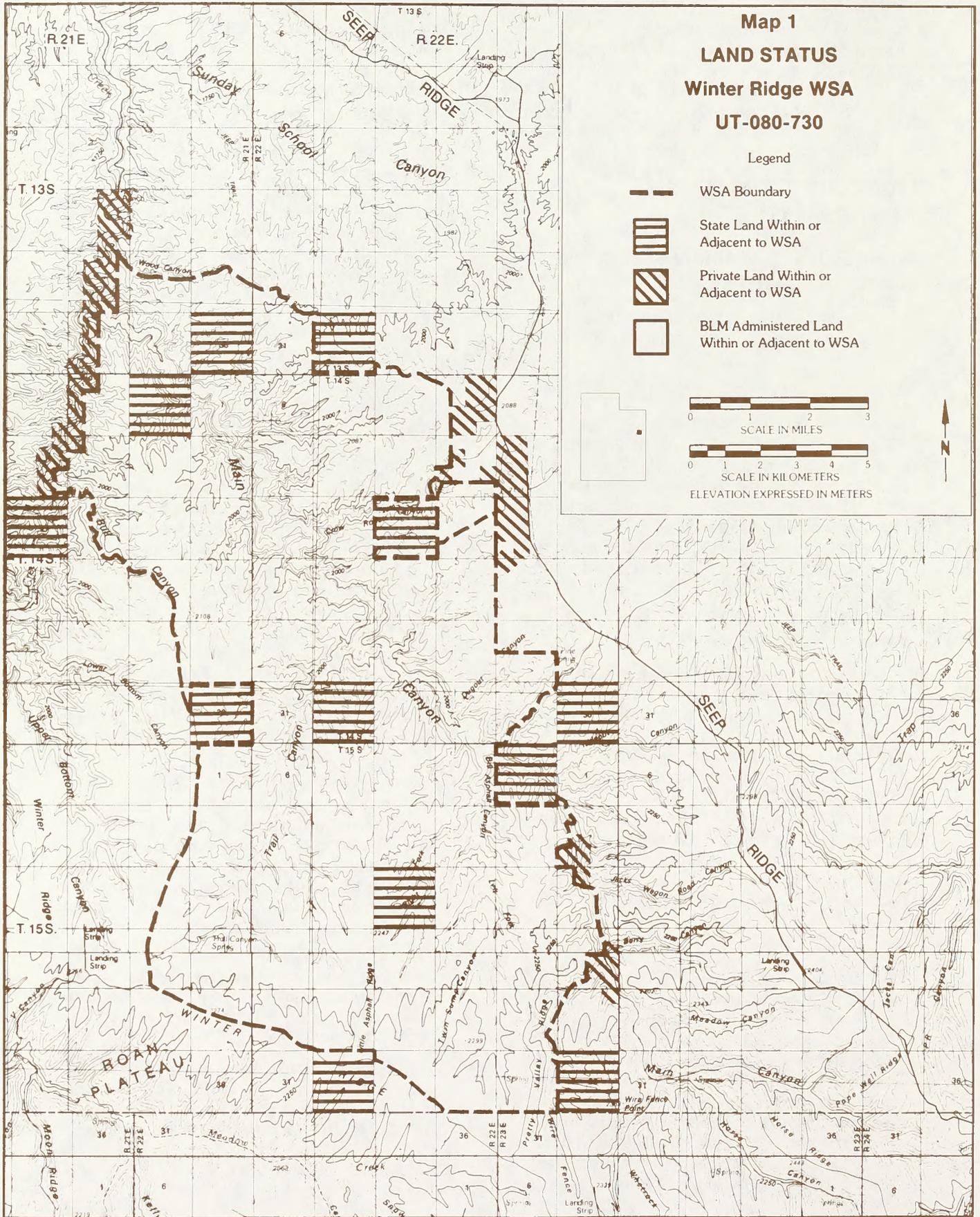
The following are specific actions that would take place under this alternative:

- All 42,462 acres would remain closed to mining claim location and open to mineral leasing (oil shale or tar sand) with standard and special lease stipulations and mineral sale. Development work, extraction, and patenting would not be involved since no mining claims exist and the closure (withdrawal) would be continued. Existing oil and gas leases (33,698 acres) and new leases could be developed under leasing

Category 1 (standard stipulations) on about 25,314 acres, Category 2 (standard and special stipulations) on about 17,068 acres, and Category 3 (no surface occupancy) on 80 acres. About 35,300 acres of the Winter Ridge WSA are part of the PR Spring Special Tar Sand Area (STSA). Of this total, some 6,228 acres are involved in lease conversion applications for combined hydrocarbon (tar sand) development (USDI, BLM, 1985). Under this alternative it is assumed that any wilderness protection (nonimpairment) stipulations applied to the leases while the area is under wilderness review would be dropped if the area is not designated. In addition to the 6,228 acres of lease conversions, new combined hydrocarbon leases on 29,072 acres could be issued in the WSA.

- The present domestic livestock grazing use of the 42,462-acre area of the WSA would continue as authorized in the RMP (2,260 Animal Unit Months [AUMs]). Existing developments of three fences, two exclosures, four spring developments, two wells, and four ponds could be maintained by mechanical methods. New range developments could be implemented without wilderness considerations. Eight proposed spring developments and five planned livestock reservoirs would be allowed. About 1,200 acres have been identified for vegetative treatments. Such treatments are planned to increase the forage by 180 AUMs, for a total of 2,440 AUMs. The herd of about 7-10 wild horses would continue to be allowed.
- Developments for wildlife (including maintenance of one existing 45-acre chained area and one exclosure), water resources, etc., would be allowed without concern for wilderness values if in conformance with the Book Cliffs RMP. (The proposed vegetative treatments noted above would be of value to wildlife as well as livestock.)
- The 42,462 acres of the WSA, including 19 miles of roads and 13 miles of ways, would remain open for vehicular use in accordance with the Book Cliffs RMP. New access could be developed.
- The entire 42,462-acre area would continue to be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.

WINTER RIDGE WSA



WINTER RIDGE WSA

- The area would continue to be managed under Visual Resource Management (VRM) Class III (60 acres) and Class IV (42,402 acres).
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances which threaten human life, property, or high-value resources. The entire area would be managed under a modified fire suppression policy.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regulations, with no management restrictions on vehicular access.
- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

Under this alternative, all 42,462 acres of the Winter Ridge WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). It would be managed in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character. Upon designation, acquisition of four sections (2,561.44 acres) of State land within the WSA (refer to Map 1) is likely, and would be authorized by purchase or exchange (refer to Appendix 3). Eight State sections adjacent to the WSA likely would not be exchanged. Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA; however, private lands are in six locations adjacent to the WSA boundary. These private lands would not be acquired by BLM.

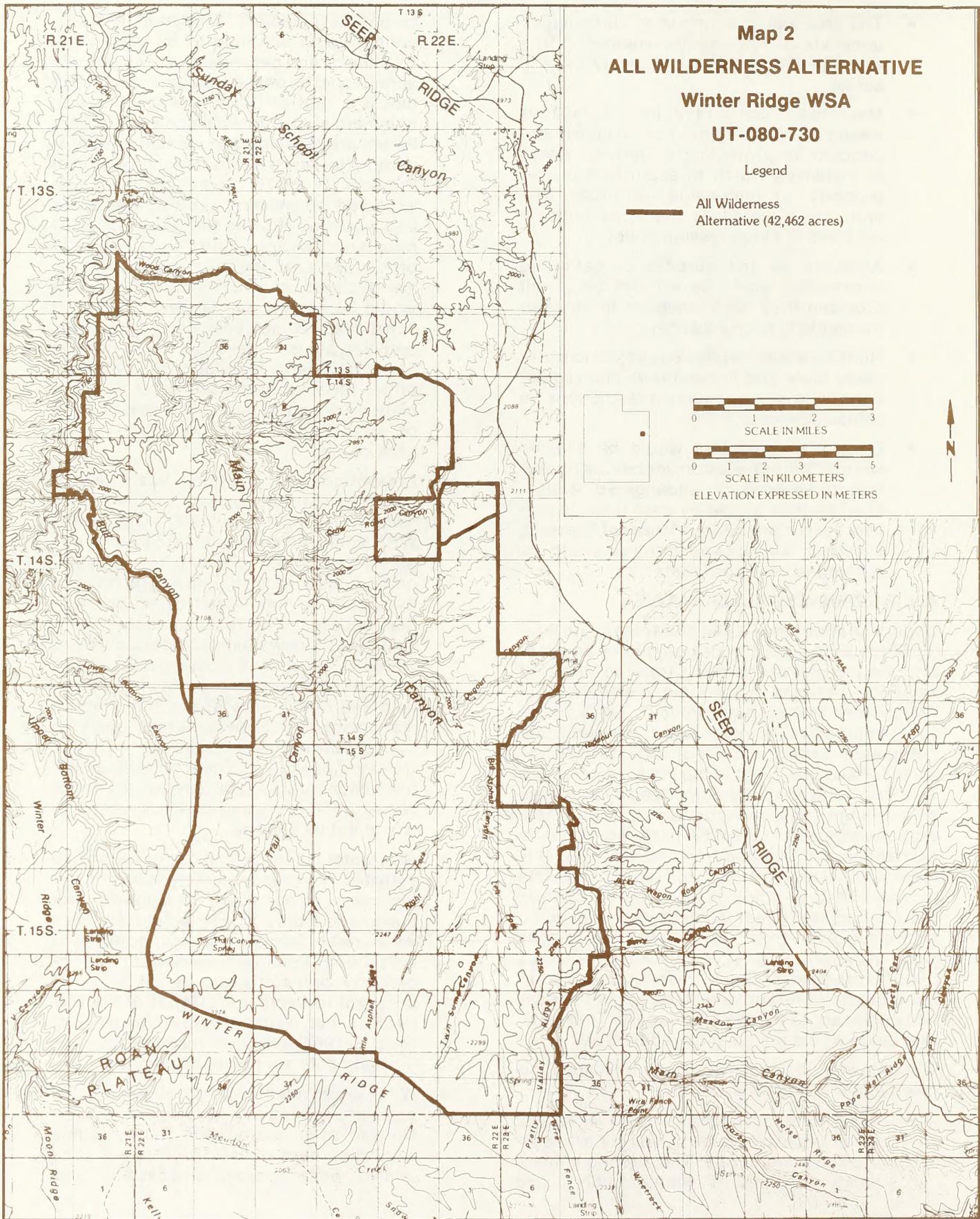
The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 42,462 acres would be closed to new mineral leasing and mineral sale. The existing mineral location withdrawal would continue and

mining development, extraction, and patenting would continue to be prohibited. Existing oil and gas leases involving 33,698 acres would be phased out upon expiration unless a find of oil or gas resources in commercial quantities is shown or unless leases are converted to combined hydrocarbon (tar sand) leases under provision of Public Law 97-78. Some gas finds are expected on existing pre-FLPMA leases and would be allowed (under provision of prior and existing rights) to continue in production until the oil and gas reserves are depleted, at which time reclamation would be carried out. Oil and gas leases converted to combined hydrocarbon leases on 6,228 acres in the WSA would contain nonimpairment stipulations; therefore, under this alternative, tar sand development on the 6,228 acres would be allowed only in a manner not degrading to wilderness values.

- Present domestic livestock grazing would be allowed to continue as authorized in the Book Cliffs RMP. The 2,260 AUMs in the WSA would remain available to livestock as presently allotted. Existing range developments as noted in the No Action Alternative could be maintained based on practical necessity and reasonableness. After designation, new rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that resource protection standards are met (refer to Appendix 1). The proposed vegetative treatments on 1,200 acres would not be allowed. Five proposed livestock reservoirs would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S. 1964). No water resource facilities or treatments are presently planned.
- Wildlife transplants and developments (45 acres of chaining currently exist) would be allowed after designation if compatible with wilderness values. Projects would be considered for approval on a case-by-case

WINTER RIDGE WSA



Map 2 ALL WILDERNESS ALTERNATIVE Winter Ridge WSA UT-080-730

Legend

 All Wilderness Alternative (42,462 acres)



ELEVATION EXPRESSED IN METERS



WINTER RIDGE WSA

basis. The existing chaining would be maintained as long as criteria are met to adequately protect wilderness values (refer to Appendix 1).

- The proposed vegetation manipulation noted for livestock, which also would be of value to wildlife, would not be allowed.
- The entire 42,462-acre area would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 CFR rules. About 32 miles of existing roads and vehicular ways would not be available for vehicular use except as indicated above. About 28 miles of the WSA boundary follow existing gravel and dirt roads which would remain open to vehicular travel. About 1 mile of the open roads would be "cherry-stemmed" through a section on the east side of the WSA.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 42,462-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pinyon nuts or noncommercial gathering of dead-and-down wood if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 42,462 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the 42,462-acre area would be taken in instances which threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface. Therefore, it is assumed that fire-fighting would be limited to hand and aerial techniques.

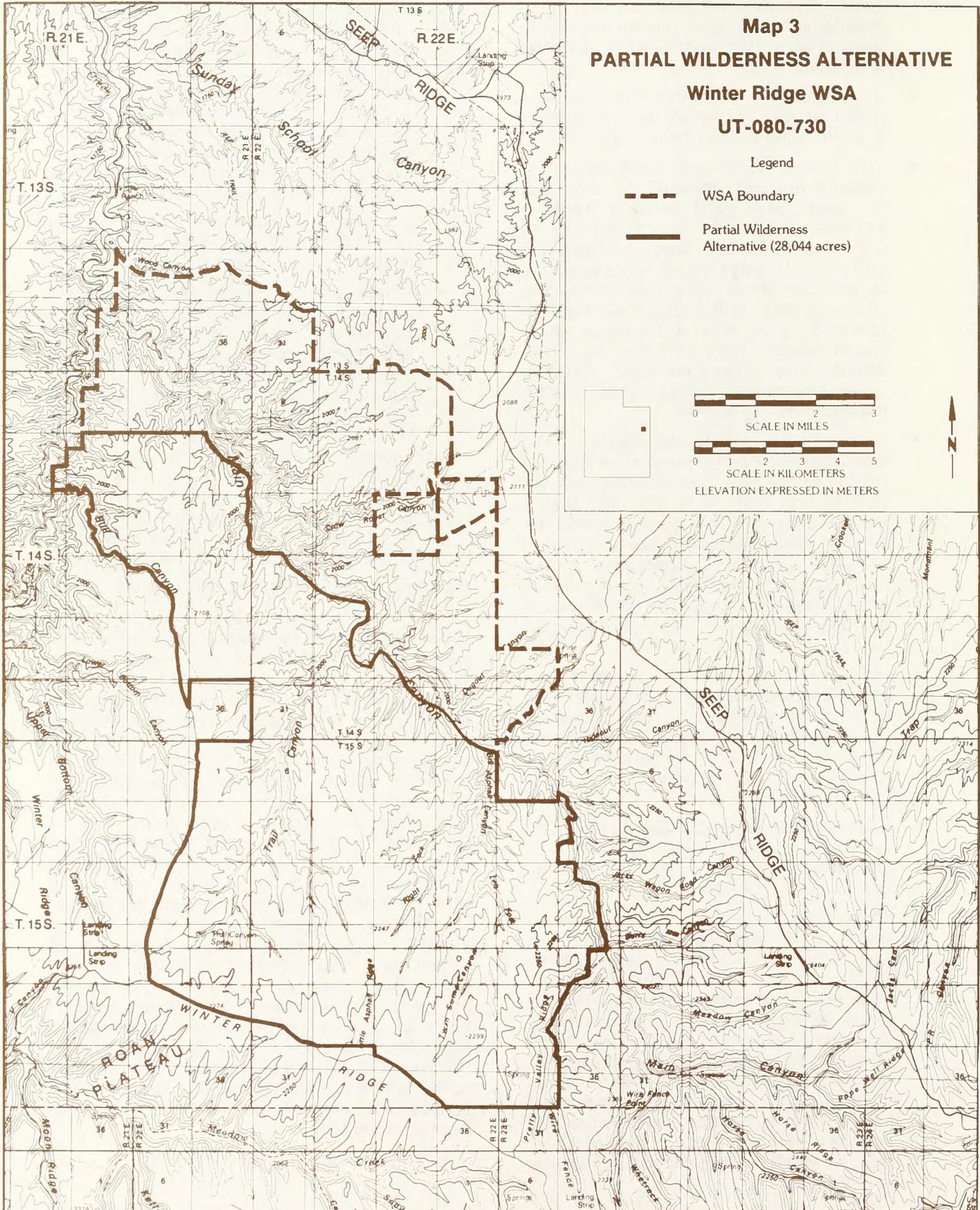
- Any activity for the purpose of gathering information about natural resources in the 42,462-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Nonmotorized hunting would be allowed subject to applicable State and Federal laws and regulations.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon clear showing that removal of the offending predators would not diminish the wilderness values of the area.

PARTIAL WILDERNESS ALTERNATIVE

Under this alternative, 28,044 acres of the Winter Ridge WSA would be designated as wilderness (refer to Map 3). The objective of this alternative is to analyze as wilderness that portion of the WSA which generally has the most pristine characteristics. The 28,044 acres analyzed as wilderness under this alternative include that part of the WSA to the west of Main Canyon. The 14,418-acre area within the WSA but outside of that designated as wilderness is to the northeast of Main Canyon and would be managed in accordance with the Book Cliffs RMP as described for the No Action Alternative. The 28,044-acre area designated as wilderness would be managed in accordance with the BLM "Wilderness Management Policy" as described in the All Wilderness Alternative. This alternative would likely involve Federal acquisition of two (1,280 acres) sections of State land by purchase or exchange (refer to Appendix 3). Six State sections adjacent to this alternative likely would not be exchanged. Assumptions regarding analysis and impacts for State lands involved in the partial alternative are the same as described for the All Wilderness Alternative. The figures and acreages under this alternative are for Federal lands only.

A summary of specific actions follows.

WINTER RIDGE WSA



WINTER RIDGE WSA

- The 28,044-acre wilderness would be closed to new mineral leasing and mineral sale. The existing mineral location withdrawal would continue and mining developments, extraction, and patenting would not be allowed in both the areas designated and not designated as wilderness. In the 28,044-acre area designated wilderness the existing oil and gas leases, which cover 21,466 acres, would be phased out upon expiration unless a find in commercial quantities of oil or gas is shown or unless leases are converted to combined hydrocarbon (tar sand) leases under provisions of Public Law 97-78. Some gas finds are expected to occur on existing pre-FLPMA leases, particularly along the southern part of the acreage designated by the partial alternative, and such leases would be in effect for the life of the oil and gas production. Oil and gas leases converted to combined hydrocarbon leases on about 2,628 acres within the area of the Partial Wilderness Alternative would contain nonimpairment stipulations; therefore, under this alternative, tar sand development on 2,628 acres would be allowed only in a manner not degrading to wilderness values. The 14,418-acre area not designated wilderness would be open to existing oil and gas lease development and future mineral leasing, without wilderness considerations. The area not designated would be managed as oil and gas leasing Category 1 (standard stipulations) on the entire 14,418 acres. Tar sand development on 3,600 acres of combined hydrocarbon leases which may be converted, and on up to about 4,740 additional acres which may be leased in the future, would be allowed in the undesignated area without wilderness considerations.
- Domestic livestock grazing would continue to occur in the 28,044-acre wilderness area. The existing 1,704 AUMs in the area would remain available to livestock as presently allotted. Existing facilities and new range developments could be allowed in the 28,044-acre wilderness if necessary for protection and management of the rangeland and/or wilderness resource provided that wilderness protection criteria are met. Eight spring developments likely could be carried out; however, construction of four reservoirs and vegetation treatments on 1,200 acres for a planned increase of 180 AUMs would not be allowed. In the 14,418-acre nonwilderness area, grazing use of 556 AUMs would continue as authorized in the RMP. New rangeland developments (one proposed reservoir) could be allowed in this area without concern for wilderness values. In this area vegetative treatments could be implemented; however, none are currently planned.
- In the 28,044-acre wilderness, new water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed only if enhancing to wilderness, if necessary to correct conditions imminently hazardous to life or property, or if authorized by the President pursuant to 4(d)(4)(1) of the *Wilderness Act*. In the remaining 14,418-acre area, water resource facility developments would be allowed without concern for wilderness values if in accordance with the RMP. None are now proposed.
- In the 28,044-acre wilderness, wildlife transplants or habitat improvements would be allowed only if they are compatible with wilderness values. In the remaining 14,418-acre area, wildlife transplants or improvements would be allowed without concern for wilderness values. None are now proposed.
- The part of the WSA that would comprise the 28,044-acre wilderness would be closed to ORV use. About 10 miles of existing roads and ways would not be available for vehicular use except in situations described under the All Wilderness Alternative. The remainder of the unit, including the existing gravel roads bordering the WSA, would remain open to vehicular travel. No roads would be "cherry-stemmed."
- A specific Wilderness Management Plan would be developed to govern use and protection of the 28,044-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products in the 28,044-acre wilderness would not be allowed except for harvest of pinyon nuts or non-commercial gathering of dead-and-down

WINTER RIDGE WSA

wood if accomplished by other than mechanical means. The remaining 14,418 acres would be open to commercial woodland harvest.

- Visual resources on the 28,044-acre wilderness would be managed in accordance with VRM Class I standards which generally allow for only natural ecological change. The remaining 14,418 acres would be managed as Class IV as outlined in the Book Cliffs RMP.
- Within the 28,044-acre wilderness area, measures to control fire, insects, noxious weeds, or disease would be taken only in instances which threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values; therefore, it is assumed that fire-fighting would be limited to hand and aerial techniques. In the 14,418-acre nonwilderness area, measures of control would be taken without wilderness considerations. A modified fire suppression policy would be followed.
- In the 14,418-acre nonwilderness area, any activity for the purpose of gathering information about natural resources would be allowed by permit. In the 28,044-acre wilderness such activity would be allowed by permit provided it was accomplished in a manner compatible with wilderness preservation. Information gathering would be limited to that conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- In the 14,418-acre area, motorized hunting would be allowed subject to applicable State and Federal laws and regulations. In the 28,044-acre wilderness, hunting would be allowed subject to applicable laws and regulations, but use would be limited to nonmotorized means.
- In the 14,418-acre area, control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious loss of domestic livestock. In the 28,044-acre wilderness, control of pred-

ators would be allowed to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, but only under conditions that would ensure minimum disturbance to wilderness values. Poison baits or cyanide guns would not be allowed.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are noted in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA is located in a Prevention of Significant Deterioration (PSD) Class II area under the provisions of the Clean Air Act as amended. This classification permits moderate air quality deterioration. The nearest Class I area is Arches National Park about 55 miles to the south. The Colorado portion of Dinosaur National Monument, 50 miles to the northeast, is classed as Colorado Category 1 which is about the equivalent of Class I.

Current air quality of the region is typical of a largely undeveloped region in the western United States. Measured long-term average concentrations of pollutants are well within current standards except for total suspended particulates. The probable cause of this exceedance is wind-blown dust from unpaved roads. Normal visual range in the vicinity varies from about 110 to 120 miles during the summer (USDI, BLM, 1983).

Geology

The Winter Ridge WSA lies along the southern edge of the Uinta Basin, in that region between the Rocky Mountains of Colorado and the Wasatch Range of central Utah. It is in the Colorado Plateau Physiographic Province. The Basin is bounded on the north by the Uinta Mountains and on the south by the Roan Cliffs and the Book Cliffs escarpment. The area is underlain by sedimentary rocks of Tertiary Age consisting of the Wasatch Formation, which is exposed in Main Canyon, and the overlying Green River Forma-

WINTER RIDGE WSA

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
WINTER RIDGE WSA**

Resource	Alternatives		
	No Action (Proposed Action)	All Wilderness (42,462 Acres)	Partial Wilderness Designation (28,044 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 18 billion cubic feet of natural gas, 375 million barrels of oil from tar sand, 14 million barrels of oil from oil shale, and 500 million tons of uranium.	Because about 70 percent of the WSA is under pre-FLPMA oil and gas lease, production would continue following designation. However, production of roughly 30 percent of the 18 billion cubic feet of natural gas potentially recoverable in the WSA would be foregone. There is a high certainty that this resource exists. Uranium and tar sand recovery could also be foregone. It is unlikely that uranium would be produced even without wilderness designation.	Up to 6 billion cubic feet of natural gas, 127 million barrels of oil from tar sand, and 4 million barrels of oil from oil shale could be recovered. It is unlikely that uranium would be recovered.
Wildlife	About 14 percent of the WSA could be affected by mineral and energy development, which could adversely affect wildlife habitat. About 200 acres of proposed vegetation treatment would be of benefit to wildlife and would allow future expansion of elk herds.	Wildlife would benefit from solitude. However, any benefits from vegetation treatment would be foregone.	Wildlife in the designated area would benefit from solitude. About 14 percent of the nondesignated portion could be disturbed by mineral and energy exploration and development, which could adversely affect wildlife habitat. The 1200-acre vegetation treatment area would be in the designated area and would be foregone.
Livestock	Grazing of 2,260 AUMs and maintenance of existing developments would continue. Proposed new developments, consisting of eight spring developments, five reservoirs, and 1,200 acres of land treatment, could be allowed. This would provide about 180 AUMs of livestock forage annually and aid in improving livestock distribution and management.	Grazing of 2,260 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. Spring developments might be allowed, but the proposed reservoirs and land treatment would not be allowed. Increase in forage would be foregone, and livestock distribution would remain as at present.	Effects would be about the same as for the All Wilderness Alternative.
Visual Resources	The quality of visual resources could be impaired on up to 7,332 acres.	Visual quality could be impaired on up to 160 acres.	Visual quality could be impaired on up to 2,188 acres (including 106 acres in the designated portion). About 75 percent of the Class B scenery would be within the designated portion and would be protected by the reduced potential for disturbance. There is no Class A scenery.

WINTER RIDGE WSA

TABLE 1 (CONTINUED)
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
WINTER RIDGE WSA

Resource	Alternatives		
	No Action (Proposed Action)	All Wilderness (42,462 Acres)	Partial Wilderness Designation (28,044 Acres)
Recreation	ORV use would continue on 30.8 miles of roads and way at current levels. Overall recreational use could increase from the current 435 visitor days per year to 650 over the next 20 years. Up to 7,322 acres of mineral-related disturbance and land treatment could reduce the quality of primitive recreation.	The WSA, including 30.8 miles of roads and way, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.	ORV use could continue on 20.8 miles of way in the undesignated portion.
Wilderness Values	Wilderness values could be lost on up to 7,332 acres (17 percent of the WSA), but the values in the rest of the WSA would not be affected.	Wilderness values would be protected, except on up to 160 acres (0.4 percent of the WSA) which could be disturbed by development of valid mineral rights.	Wilderness values would be protected, except on 106 acres which could be disturbed by valid mineral rights. Additional impairment could be expected on up to 14 percent of the 14,418 acres not designated. Overall, wilderness values could be lost on 5 percent of the WSA. About 71 percent of the area meeting the standards for outstanding opportunities for solitude and 74 percent of the area meeting the standard for naturalness would be in the designated portion and would be protected by reduced potential for disturbance.
Land Use Plans and Controls	This alternative would be consistent with the <i>Uintah County Master Plan</i> , State of Utah plans and policies, and the current BLM Book Cliffs RMP.	This alternative would not be consistent with Uintah County policy and their concept of multiple use. It would be consistent with State policy if lands were exchanged. Designation would constitute an amendment of the BLM Book Cliffs RMP.	Partial wilderness designation as the All Wilderness Alternative.
Socio-economics	Annual local sales of less than \$438,284 and Federal revenues of up to \$154,258 would continue. An additional \$41,292 per year in Federal leasing and royalty revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$438,284 and Federal revenues of up to \$3,164 would continue, but Federal revenues of up to \$38,460 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.	The effects of this alternative would be the same as for the All Wilderness Alternative, except that annual Federal revenues would be reduced by up to \$27,098.

WINTER RIDGE WSA

tion, which is exposed throughout 90 percent of the tract (parts of the Wasatch and Green River Formations are interfingered). Numerous, but gentle, northwest-trending folds and small faults are found in this area (Cashion, 1973). The WSA consists of relatively flat and gently sloping bench areas dissected by shallow canyons. Elevations within the WSA vary from 5,700 feet in Main Canyon near the northwest corner to 7,600 feet along Pretty Valley Ridge near the southeast corner. The predominant topographic feature is Main Canyon, which diagonally bisects nearly the entire area from northwest to southeast.

Despite the relatively simple geology visible at the surface of the WSA, the subsurface geology in this area is complex. It straddles what geologists refer to as the Uncompaghre Uplift, a northwest-trending mountain range that existed in this area in late Paleozoic time (Elston and Shoemaker, 1969; Stone, 1977). This uplift coincided in trend and position with the present-day Uncompaghre Plateau, but it extended farther north as a distinct topographic feature. The Uncompaghre Uplift probably stood several thousand feet above sea level, and enormous volumes of rock were shed into nearby marine basins during late Paleozoic and early Mesozoic time.

The area encompassing the WSA can be subdivided into two somewhat distinct late Paleozoic settings. The southern part of the WSA overlies the Uncompaghre Uplift, and Paleozoic and Mesozoic rocks are not preserved. The northern part of the WSA overlies a faulted segment of the Uncompaghre Uplift, in which a few thousand feet of Paleozoic rock are preserved. The subsurface fault separating these two areas is referred to as the Garmesa fault zone (Stone, 1977).

Soils

Soils in the WSA vary greatly. Those on the flatter benches and gentle slopes south of Main Canyon are very deep and well-drained loams. The canyon sides are shallow, well-drained gravelly loams and those in the northern part of the unit near Seep Ridge are very shallow to shallow and well-drained. Approximately 5 percent of the WSA consists of rock outcrop.

Table 2 displays current erosion condition.

TABLE 2
Erosion Condition

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	0	0	0
Moderate	1.9	6,497	15	12,344
Slight	0.9	35,965	85	32,369
Stable	0.3	0	0	0
Total		42,462	100	44,713

Sources: USDI, Bureau of Reclamation, 1975.

Vegetation

Ridgetop vegetation is composed of broad sagebrush-grass parks and islands of pinyon-juniper on Winter Ridge with small sagebrush parks scattered among broad belts of pinyon-juniper on Seep Ridge. The canyons are predominantly pinyon-juniper with Douglas fir intermingled in minor amounts on the north-facing canyon sides. Ponderosa pine are found occasionally near the heads of these canyons. The canyon bottoms are mostly sagebrush-grass with some very minor amounts of riparian vegetation occurring in Main Canyon. Table 3 lists existing vegetation types and acreages.

TABLE 3
Existing Vegetation Type

Existing Vegetation Types	Acres	Percent of WSA
Pinyon-Juniper	33,739	79
Sage-grass	8,723	21
Total	42,462	100

Source: USDI, BLM, 1974

The Winter Ridge WSA lies in the Rocky Mountain Forest Province as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type in the WSA is juniper-pinyon woodland. PNV is the vegetation type that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

There have been no threatened, endangered, or sensitive plants located in the WSA. However, there is identified potential habitat in the WSA for the sensitive species *Aquilegia barnebyi*, *Cryptantha barnebyi*, *Penstemon grahamii*, and *Penstemon albifluvis*. This potential habitat occurs

WINTER RIDGE WSA

near Wood Canyon and along the Seep Ridge road.

Water Resources

There are two wells, four reservoirs, and twelve springs on which BLM has water rights for livestock and wildlife. Four of the springs have been developed, and one of those is in need of maintenance. The reservoirs need maintenance to improve their water-holding capacity. One well has not been pumped. There are no perennial streams.

Water quality of springs and reservoirs within the WSA is adequate for all existing benefitting uses.

Ground water is found in shallow, perched aquifers and deep artesian aquifers from 2,000 to 7,000 feet below the surface under the WSA. The springs mentioned above are supported by the shallow, perched aquifers.

No floodplains or wetlands are found within the WSA.

Mineral and Energy Resources

The Winter Ridge WSA is in an area well known for hydrocarbon potential (oil and gas, tar sand, and oil shale). The Book Cliffs to the south of the WSA are known to contain coal. Occurrence of other minerals is speculative.

The BLM, in cooperation with the U.S. Department of Energy had each WSA in Utah assessed for its energy and mineral resources by SAI (1982). Refer to Appendix 5 for a detailed description of the assessment rating system. The energy and mineral rating summary for the Winter Ridge WSA is given in Table 4.

The WSA has been assigned a relatively high importance rating for mineral resources, chiefly because of the significant hydrocarbon deposits existing within the tract and the adjacent existing gas production. An overall importance rating (OIR) of 3 (on a 1 to 4 scale, where 4 is equated with high mineral importance) is given for the Winter Ridge WSA. The OIR attempts to integrate the individual mineral resource evaluations for a tract with other data, such as gross economics or the proposed location of energy corridors, into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as suitable for wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation

report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the FLPMA. BLM and the Secretary of the Interior will also consider the available reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but are not found or produced in the United States in sufficient quantities to meet such a need. Although highly speculative, vanadium could be found in the WSA. Vanadium is currently listed as a strategic and critical material (Federal Emergency Management Agency, 1983).

TABLE 4
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c4	Less than 60 billion cubic feet of gas
Tar Sand	f4	c4	More than 500 million barrels
Oil Shale	f2	c4	48 million barrels
Coal	f1	c4	None
Uranium/ Vanadium	f2	c1	500 tons
Geothermal	f1	c4	None
Hydropower	f1	c4	None
Copper	f1	c2	None
Phosphate	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

Oil and gas production from the present-day Uncompaghre Plateau comes almost exclusively from small-to moderate-size, shallow fields producing from the Entrada Sandstone and Morrison Formation of Jurassic Age. Many oil and gas wells have been drilled within and near the WSA, and drilling activity remains high in nearby surrounding areas (Petroleum Investment Company, 1981). The chief targets are those units already

WINTER RIDGE WSA

productive in the area; namely, the Entrada Sandstone, the Morrison Formation, the Cedar Mountain Formation, and the Dakota Sandstone. There are no known large structures within the area (Cashion, 1973), and it seems reasonable to assume that the largest structural features in this general area have already been drilled and that future discoveries will be largely in stratigraphic traps, particularly in lenticular sandstone bodies and small structural traps. The Winter Ridge WSA is considered favorable for a shallow gas field with ultimate recoverable reserves of less than 60 billion cubic feet. The certainty that oil and gas resources exist in the WSA is high. Currently, 33,698 acres, representing 79 percent of the unit, is under oil and gas lease.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981). Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA leases.

Table 5 lists recent activity on pre-FLPMA leases in the Winter Ridge WSA. Associated pipelines also exist in the WSA. Production of gas from within the WSA amounts up to about 7.5 million cubic feet per day from 10 producing wells on pre-FLPMA leases. The amount varies to lower amounts depending on seasonal market conditions.

Leases that are producing oil or gas prior to their original expiration date or those that are part of a unitized field would continue. Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases. Table 6 lists the leasing status for the Winter Ridge WSA.

The entire WSA is covered by BLM's oil and gas

category system. Category 1 contains 25,314 acres; Category 2, 17,068 acres; and Category 3, 80 acres.

Oil Shale and Tar Sand

Oil shale is related to the sediments (comprising the Green River Formation) which were deposited in ancient Lake Uinta, a body of water that covered about 20,000 square miles in the present-day area of the Uinta and Piceance Creek Basins. In the Piceance Creek Basin in Colorado, where the thickest and richest oil shales occur, the Green River Formation is subdivided generally into four members.

The Parachute Creek Member, particularly the upper part containing the Mahogany Zone, contains the richest oil shale deposits in the region, ranging in potential yield from 3 to 60 gallons of oil per ton (Van West, 1972). The Mahogany Zone of the Parachute Creek Member extends into the northern and southern parts of the Winter Ridge WSA. The oil shales in this area are relatively thin and low grade compared with the oil shales deposited along the axis of the Uinta Basin farther north (Cashion, 1981); however, there does appear to be future development potential, with an estimated 48 million barrels of shale oil in-place within the WSA.

Of the 50 plus tar sand deposits identified throughout the State of Utah, more than 96 percent of the oil is contained in six deposits, one of which is the P.R. Springs STSA, which lies partly within the Winter Ridge WSA. About 35,300 acres of the STSA are within the WSA. (About 7,162 acres of the WSA at the lower end of Main Canyon are not in the STSA.) The oil in-place is found primarily in the sandstones and siltstones of the Green River Formation of Tertiary Age (particularly in the Douglas Creek and Parachute Creek Members). Nearly all of the eastern two-thirds of the WSA is underlain by a 10- to 15-foot continuous tar sand sequence yielding 1,000 barrels per acre-foot or about 15,000 barrels per acre. Most of the remaining one-third of the tract also contains tar sand but at somewhat lower quality. It is estimated that the entire WSA contains more than 500 million barrels of oil in-place from tar sand. The WSA contains portions of four lease conversion applications. These are Beartooth B, (598 acres), Enercor (4,206 acres), Enserch (1,020 acres), and Mobil (404 acres), for a total of 6,228 acres in the WSA. The impacts of developing these lease conversions are being analyzed in the *PR Spring Combined Hydrocarbon Lease Conversion EIS* scheduled for completion in December 1985.

WINTER RIDGE WSA

TABLE 5
Recent Oil and Gas Activity
on Pre-FLPMA Leases

Well Number	Company	Date Drilled	Construction Actions				Remarks
			Miles of Road		Major Cuts/Fill Required		
			Const.	Upgrade	Roads	Drill Pad	
In Main Canyon							
9-12-14-21	Coseka	1982	12.0		Yes	No	Producing
6-7-14-22	Coseka	1982	-		No	No	Producing
12-18-14-22	Coseka	1983	-		No	No	Producing
16-19-14-22	Coseka	1983	-		No	No	Producing
8-20-14-22	Coseka	1983	-		No	No	Producing
13-1-14-21	Coseka	1984	1.6		Yes	No	Dry Hole - Plugged
West of Main Canyon							
5-13-15-21	Coseka	1981	0.3	1.1	Yes	Yes	Producing
2-18-15-22	Coseka	1981	2.1		No	Yes	Producing
1-28	Chorney	1972	-	0.4	No	No	Producing
East of Main Canyon							
1-10-14-22	Coseka	1983	0.1		No	No	Producing
7-21-14-22	Coseka	1981	0.2	0.6	Yes	Yes	Producing
Number 1	Exxon	1981			Yes	Yes	Producing
Number 2	Exxon	1981	0.6		Yes	Yes	Road and pad constructed but approval lapsed without drilling
Number 3	Skyline	1963	-		-	-	Producible
	Total		16.9	2.1			

Source: USDI, BLM, 1974.

Coal

Coal-bearing rocks of Cretaceous Age almost certainly exist at great depth beneath the WSA. The coal is thin, and its quality is apparently poor. It can be assumed that the coal resource will not be mined.

LOCATABLE MINERALS

Locatable mineral activity is governed by the Mining law of 1872. Under this law, the mining claimant has the right to locate, develop, and produce mineral resources on open public land. The entire WSA falls within an oil shale withdrawal which segregates the public lands from mineral entry and appropriation under the Mining Law of 1872. Only those claims which pre-date the 1930 withdrawal are considered to have grandfathered rights. The Winter Ridge WSA has no pre-

drawal claims and has no demonstrated value for locatable minerals. The Winter Ridge WSA has no history of economic production of locatable minerals and is not considered potentially valuable for development. The existing geologic environment may contain uranium/vanadium or copper deposits at considerable depth, but this is highly speculative. No mining claims exist nor can any mining claims be located in the WSA, as a result of the withdrawal.

SALABLE MINERALS

No salable minerals of note are located in the WSA.

WINTER RIDGE WSA

TABLE 6
Oil and Gas Leases

Leases	Acres	Percent of WSA
Pre-FLPMA Leases	29,642	70
Post-FLPMA Leases	4,056	9
Unleased-Open to Future Leasing	8,764	21
Total	42,462	100

Source: USDI, BLM, 1974.

Wildlife

Virtually the entire Winter Ridge WSA is recognized as important wildlife habitat. Approximately 70 species of mammals, 174 species of birds, 7 reptile species and 2 amphibians inhabit the general area. As would be expected, some are common yearlong residents, while others are found only during a particular season.

Deer and elk are probably the most notable wildlife found in the area. However, sage grouse, blue grouse, mourning doves, and chukar partridge are also found. Black bear and cougars are there in significant numbers. This is particularly true for bear.

No threatened or endangered species are year-round residents of the WSA.

Occasionally, peregrine falcon and bald eagle (both protected species) pass through the area during spring and fall migration. A variety of other raptors use the area, including the golden eagle. It is reported as a widespread nester in northeastern Utah (Behle, 1975). Nesting probably occurs along the Main Canyon drainage. The golden eagle is presently rated as a sensitive species. Other important raptors using the area include the red-tailed hawk, Cooper's hawk, and the American kestrel. Other avian inhabitants include the goshawk, great horned owl, and a wide variety of small birds (Behle, 1975).

Deer and elk populations are increasing over the entire north Book Cliffs (Karpowitz, 1982). Increased fawn production is also noted.

Table 7 provides habitat information as it relates to the Winter Ridge WSA.

Wildlife management facilities in the Winter Ridge WSA consist of the Crows Roost Study Enclosure and the 45-acre Pine Springs Chaining. Three actions have been proposed for wildlife habitat improvement: (1) sagebrush burning on Winter Ridge; (2) pinyon-juniper conversion on Winter Ridge; and (3) opening closed stands of mountain brush through prescribed burning. These

activities are included in the 1,200 acres of vegetation treatments described in the Livestock and Wild Horses/Burros section.

TABLE 7
Crucial Wildlife Habitat

Species	Habitat Designation	Season of Use	Acreage	Percent of Herd Unit Total
Deer	Crucial	Winter	7,400	4.6
	Crucial	Summer	14,400	7.0
Elk	Crucial	Winter	6,700	6.4
	Crucial	Summer	14,400	7.0
Sage Grouse	Crucial (nesting)	Spring	800	—

Source: USDI, BLM, 1974.

Forest Resources

There are approximately 11,900 acres of productive and potentially accessible pinyon-juniper woodlands capable of producing fenceposts and firewood. Currently, 10 percent of this area is accessible for harvest. There is some ponderosa pine and Douglas fir in the WSA. The Douglas fir is located on steep north-facing slopes and the ponderosa pine is near the heads of the canyons. These two species are in limited quantity and are of no commercial value.

According to BLM's Woodland Survey of 1981, there are approximately 12 cords of green firewood per acre in the WSA with a total estimated volume of 142,800 cords. According to this same survey, there are 4 posts per acre for a total of 45,000 posts. There are more posts in this area than any other area in the southern Uinta Basin.

Because of limited access, demand for these products is low, with no harvest in the WSA at the present time.

Livestock and Wild Horses/Burros

The Winter Ridge WSA includes four grazing allotments and three ranching operators. There are 2,260 AUMs of forage produced annually within the WSA. Table 8 lists livestock grazing use data for the WSA.

TABLE 8
Livestock Grazing Use Data

	Winter Ridge AMP	Horse Point	Sweetwater	Sunday School
AUMs in Allotment	1,979	2,346	7,276	3,777
AUMs in WSA	1,566	138	51	505
Percent in WSA	79	6	1	13
Number of Operators'	2	1	1	2
Class of Livestock	Cattle	Cattle	Cattle	Cattle
Season of Use	Yearlong Winter	Spring & Summer	Spring, Fall Winter	Spring, Fall

Source: USDI, BLM, 1974, and 1984a.

'Some operators use more than one allotment.

In the WSA, there are 1,200 acres of rangeland that could feasibly be treated by various methods to increase total forage production. Through these different vegetation treatments, a total of 180 AUMs of additional forage could be produced.

Present livestock management facilities include three fences, two exclosures, four spring developments, two wells and four ponds.

A herd of seven wild horses currently inhabit the Winter Ridge area of the WSA yearlong. They are concentrated in the Little Asphalt Ridge area.

Visual Resources

With the exception of Main Canyon and some of the other drainages, the topography is rolling to hilly with ridges running primarily northeast-southwest. Main Canyon exhibits narrow, layered vertical rock formations with predominate tan, cream, and to a lesser extent, red-brown coloration. Texture in this canyon is composed of rough side walls with fairly smooth drainage bottoms. The dominant characteristic is Main Canyon with various side drainages. Irregular wildfire areas have exposed tan, rocky soil.

The southwest part of the area is flat to gently rolling and lacks dramatic topographic relief. Except in the drainages, soil is not highly visible to the casual observer. On closer observation, tan, cream, and brown soil colors are visible.

Vegetation in most of the side drainages is varied including tree, shrub, and ground cover species. For most of the area, pinyon pine and juniper dominate, with some Douglas fir on northern

slopes. Coloration is light green, dark green and grey-green. Most vegetation is pyramidal to ovate in silhouette.

Man-made disturbances visible outside the WSA include silver-colored cylindrical storage tanks, surface pipelines, rectangular drill pads and roads. Internal disturbances include rectangular drill pads denuded of vegetation with stockpiles of soil; red, silver and black gas regulators; roads; and wildfire scars with irregular perimeters that are generally devoid of vegetation.

Visual evidences of vehicle travel generally are most numerous in Main Canyon and the area northeast of Main Canyon.

BLM visual resource evaluations assessed scenery as Class C on 37,012 acres (Environmental Associates, 1979). This included all areas except 5,450 acres in Main Canyon and the northwest corner of the unit within view of Willow Creek which were assessed as Class B scenery. Public concern for scenic quality preservation (expressed as sensitivity) is medium for the Main Canyon drainage and Willow Creek and low for the major portion of the unit.

Most of the area is seldom seen with exception of the southeast (vicinity of Main Canyon) and northwest corners near Willow Creek, considered as foreground and middleground from travel corridors of Seep Ridge road and Willow Creek road.

The resulting VRM class for the majority of the area (42,402 acres) is Class IV. A tract of land (60 acres) in the northwest corner of the unit in the vicinity of Willow Creek is Class III.

Cultural Resources

There are 26 archaeological sites in the WSA. Two of these have been recorded as having scientific values. Neither site has been submitted to the Utah State Historic Preservation Office for a review of determination of eligibility to the National Register. One is a prehistoric camp that covers about 5 acres and is listed for its extensive lithic debris and numerous fire hearths. The other site contains prehistoric petroglyphs of possible Fremont cultural affiliation.

European influence in the region dates from Mexican traders and French fur trappers in the earlier 1800s. Louis Robidoux left his signature in the WSA and it is one of few known.

A total of from 5 to 7 acres within the WSA are considered to contain significant cultural resources.

WINTER RIDGE WSA

Recreation

Recreational activities are principally centered around the fall season and comprise hunting of elk, deer, bear, lion, coyotes and rabbits. Approximately 385 visitor days of use annually are related to hunting on lands within the WSA.

Some Christmas tree cutting occurs in the northern end of the unit, perhaps 15-20 trees per year. No commercial firewood cutting is permitted but some family use firewood cutting undoubtedly occurs. About 50 visitor days of use are estimated for Christmas tree and firewood cutting activities.

Opportunity exists for hiking, horseback riding, and sightseeing. In winter, the area is lacking in snow of sufficient quantity to be desirable for cross-country skiing. There is little present demand for these activities particularly since these same opportunities are available nearer population centers. No estimate of visitor days of use, if any, is available. Total recreation use for the WSA is estimated at about 435 visitor days per year, all of which is related to ORV use or vehicle access on the 32 miles of roads and ways in the WSA, and on the 28 miles of road bordering the WSA. The entire WSA is open to ORV use.

Wilderness Values

SIZE

The unit contains 42,462 acres of public land. Generally rectangular in shape, the unit averages 5 miles wide and 12 miles long.

NATURALNESS

The dominant human imprints found are those resulting from oil and gas development and livestock grazing. Recent drilling activity affecting naturalness has occurred in the northern portion along Main Canyon and along the southern edge of the unit. Table 5 lists the oil and gas activities on pre-FLPMA leases in the WSA. Accumulated surface disturbance has been the construction of 16.9 miles of roads, the upgrading of 2.1 miles of road, and the clearing and leveling of 25 acres for drill pads. Five drill pads required major cuts and fills and 2 miles of road required major cuts and fills.

A summary of the other imprints is as follows:

1. A 4-inch surface pipeline runs along the northern edge of the unit, and a buried pipeline 7.6 miles long in Main Canyon.

2. Barbed-wire fences with steel and cedar posts exist in 11 locations, for a total of 9.5 miles.
3. Study plots (Crows Roost enclosure and Winter Ridge brush control plot) cover a total of 7 acres.
4. Four spring developments are present in the southern part of the unit.
5. Four livestock reservoirs, each one-half acre in size, are located in the WSA.
6. Two drilled water wells are in Main Canyon.
7. Pine Spring pinyon-juniper chaining covers 45 acres.
8. Ways total 13 miles in the WSA.

A total of 35,835 acres of the unit is considered to meet the wilderness criteria for naturalness. About 6,627 acres lack naturalness.

The greatest loss of naturalness is in the Main Canyon area. Main Canyon is narrow, twisting, and rimmed by 600-foot walls. The placement of 13.6 miles of road and five gas wells (plus one dry hole) makes the imprint of man obvious to a visitor. Readily visible are the drill pads, well heads, buried pipeline route, and access roads. Because of the narrowness of the canyon and the presence of low sparse vegetation, these imprints cannot be screened. Two barbed-wire pasture division fences cross the canyon and are only slightly visible. The water well at the mouth of Crow Roost Canyon has not been pumped and only 1 foot of an 8-inch casing protrudes above ground level. In Main Canyon, the naturalness has been impaired to the point of not being outstanding.

East of Main Canyon, 5 miles of a 4-inch surface pipeline run along the northern edge of the unit. Because the trees were removed along a 20-foot right-of-way, the pipeline is a linear intrusion and is readily visible. However, from a distance or from an oblique angle, the pipeline is hardly evident. The Skyline No. 3 well, drilled in 1963, is screened by Crow Roost Canyon; the access road, constructed in the wash in the bottom of the canyon, has nearly eroded away.

On pre-FLPMA leases four gas wells, one abandoned drill pad, and 1.5 miles of road have been located in the portion of the WSA east of Main

WINTER RIDGE WSA

Canyon since 1981. Because major cuts and fills were required for three of the drill pads and their access roads, impacts to naturalness within .50 mile of the imprints are significant. All drill pads and access roads are highly visible from adjacent ridges. The Crows Roost Exclosure, approximately 4 acres in size, is fenced with a cedar post and net wire fence. The study plot does not significantly affect naturalness. The Pine Springs chaining laps into the unit in two areas, both under 30 acres in size. Because of the irregular edge of the clearing and the small size of the two areas, naturalness is moderately affected. The division fence, a barbed-wire fence of steel and cedar posts, borders the northern edge of the Pine Spring chaining and protrudes into the unit for 0.70 miles. Because the fence right-of-way has been bladed, a visual scar will be evident for the next 20 to 30 years.

Overall, the quality of naturalness is rated as medium in the portion of the WSA east of Main Canyon.

West of Main Canyon, a barbed-wire fence along the west edge of the unit is 7.10 miles long and is not highly visible as vegetation was not removed along the right-of-way. Another 1.10 miles is located along the southern boundary. Neither fence significantly affects naturalness as both are adjacent to the unit's boundary and built with a minimum of disturbance to soil and vegetation. A 3-acre vegetation study plot is located about .25 mile from the south boundary. Because a 1-acre tract within a sagebrush park was converted to grassland, a slight contrast in color is evident. Naturalness is only slightly affected as the 1-acre plot is enclosed by a barbed-wire range fence. The four stock reservoirs and four spring developments blend with the natural environment and do not affect naturalness.

The biggest detraction to naturalness west of Main Canyon is the placement of well No. 2-18-15-22, with a 2-mile access road in the southwest corner of the unit. This well penetrates an area that heretofore was pristine. Although this well cannot be seen from more than .50 mile away, it is located in an area that would be frequently travelled by wilderness visitors. West of Main Canyon, the quality of naturalness is rated as outstanding on much of the area, until additional oil/gas wells are drilled on pre-FLPMA leases.

Overall, the Winter Ridge WSA is judged to lack outstanding naturalness. Reasons for this overall perception are the concentration of imprints in Main Canyon, the existence of 17.8 miles of road within the unit, the size and magnitude of disturbance created by an oil and gas development

within the unit and on adjacent lands, and influence of nearby tar sand exploration and oil shale development.

SOLITUDE

Solitude is influenced by the oil and gas activities within this unit. Traffic created by the drilling and maintenance crews does not give a visitor the feeling of being alone. The influence zone affected by sights and sounds of drilling, travel, and surface disturbance is about .50 mile. Marking a buffer zone around the existing wells and travel corridors, about 10,565 acres of the unit do not have outstanding solitude.

The largest single area impacted is Main Canyon. The canyon traverses diagonally through the center of the unit and is narrow with steep-sided walls. With the location of 12 miles of road and six gas wells within the canyon, a major portion of the area was judged as not offering solitude. No opportunities exist for vegetation or topographic screening.

In the remaining 31,897 acres of the unit, opportunities for solitude are generally good. On the flat ridge tops where dense stands of pinyon-juniper grow and in and at the head of the shallow side canyons, vegetation and topographic screening exist. In the southern portion, large sagebrush parks dominate some of the ridge tops. Here, vegetation screening is poor, especially adjacent to the southern boundary road.

Off-site sounds are evident only in the northeast corner of the unit and permeate the unit about 1 mile. Sounds that carry originate from Geokinetics, an in-situ oil shale project located 1 mile from the unit. Audible sounds consist of pumps, generators and earth-moving equipment. Additional off-site sounds are expected from adjacent tar sand development in the future.

PRIMITIVE AND UNCONFINED RECREATION

Opportunities for primitive and unconfined recreation exist for day hiking, backpacking, horseback riding, and big game hunting. However, none of these activities can be considered outstanding. Day hiking and backpacking do not qualify as outstanding because the unit lacks a focal point of interest. No perennial streams, ponds, or lakes exist, and there are no prominent overlooks or high terrain which offer sweeping panoramic views. Along the rim of Main Canyon, a person has a limited view of small vertical rock cliffs, talus slopes, and a narrow canyon floor. The landscape, composed principally of shallow canyons and flat ridge tops, does not offer challenge or uniqueness. These factors, as well as repetitious vegetation patterns of solid stands of

WINTER RIDGE WSA

pinyon and juniper trees with interspersed sagebrush openings, make hiking and backpacking an ordinary experience.

The terrain is suited for the use of horses but again, because of a lack of a focal point and diversity, this activity cannot be regarded as outstanding.

Big game hunting for elk and deer is popular within the region. However, the quality of the wildlife habitat within this unit is lower than surrounding areas. As a consequence, big game numbers, hunting quality, and big game viewing are poorer within the unit than outside.

Other activities such as sightseeing for geologic features and nature study are not outstanding. The rock formations, erosional patterns, color contrast between the soil, rock and vegetation, and canyon characteristics are common within the physiographic region. No threatened, endangered, or sensitive plants or animals have been found in the area to enhance nature study.

Lack of dependable snow depths in winter make cross-country skiing questionable. Opportunities for high-interest nature photography are poor.

No area was identified as having outstanding opportunity for primitive and unconfined recreation.

SPECIAL FEATURES

A herd of seven horses currently inhabit Little Asphalt Ridge, located in the south-central portion of the WSA. The remoteness of the area and the feed available in an old burn provide the needed year-round habitat for the horses.

There have not been any threatened, endangered, or sensitive plants specifically located and identified. However, potential habitat for the sensitive species *Aquilegia barnebyi*, *Cryptantha barnebyi*, *Penstemon grahamii* and *Penstemon ablafuvus* was identified along Wood Canyon and Seep Ridge.

Land Use Plans and Controls

The Uintah County Master Plan does not specifically address the Winter Ridge WSA. However, the county planning staff stated that designation of Winter Ridge as wilderness would conflict with present land use, which encourages development of the oil and gas reserves (Nicholson, 1982). County planning concerns also focus on the possible economic impacts of wilderness on continued energy development.

There are no private surface or subsurface mineral rights within the unit. There are no existing rights-of-way across the unit other than for a 4-inch pipeline on the northern edge and the 4½ inch pipeline in the Main Canyon area.

The BLM land use plan for this area, the Book Cliffs RMP (USDI, BLM, 1984c), shows multiple-use management as described in the No Action Alternative. Uses authorized include grazing, mineral leasing, livestock grazing, wood harvesting, and hunting.

There are in-holdings of four State sections, totaling 2,560 acres. No developments have occurred on these sections to date. However, all of these sections are under lease for oil, gas, and livestock grazing as managed according to plans and policies of the Utah Division of State Lands. Reasonable access to these State in-holdings is required by law.

Socioeconomics

DEMOGRAPHICS

Winter Ridge WSA is located in southern Uintah County, Utah. It is approximately equal distance (60 miles) from Vernal in northern Uintah County and Grand Junction in western Mesa County, Colorado.

The principal company currently developing the gas field in the area is physically located in Grand Junction. As a result, many of the people and much of the equipment used in this venture come from that area. An unknown percentage of the recreational use (primarily hunting) in the Winter Ridge area comes from Grand County to the south.

Uintah County can be characterized as rural and sparsely populated. The 1983 county population was 24,600, less than 2 percent of the Utah State population of about 1.5 million (Utah Office of Planning and Budget, 1984). The majority of the county is unpopulated, with 66 percent of the settlement concentrated in the Ashley Valley area. About 27 percent of the county's population lives in Vernal. Vernal, with a population of 6,600 (U.S. Department of Commerce [USDC], Bureau of the Census, 1982), is located in northeastern Uintah County. Vernal is basically a tourism, energy, and farming community. Population growth in Uintah County has increased about 5 to 8 percent per year in the past 5 years, primarily as a result of energy development.

The Ute Indian Tribe currently has 1,890 enrolled tribal members. The tribe's population has in-

WINTER RIDGE WSA

creased significantly through the last decade, from 1,292 members in 1972 to 1,890 members in 1981, a 46-percent increase. In 1980, 85 percent of the enrolled tribal members lived on or near the reservation. An additional 420 Indians live on or near the Uintah and Ouray Indian Reservation but are not enrolled Ute tribal members. However, they may be members of other federally recognized Indian tribes. The Uintah and Ouray Indian Reservation has experienced out-migration rather than in-migration, due to the lack of attracting economic opportunities.

In Mesa County, Colorado, the largest community is Grand Junction which had a 1981 population of 87,100 (USDC, Bureau of the Census, 1981). The Grand Valley, which includes Grand Junction, lies in the midwestern part of Mesa County and contains 83 percent of the county's population. Grand Junction serves as a major service center for western Colorado and southeastern Utah (USDC, Bureau of Economic Analysis, 1983). Mining activity and general regional growth have brought moderate growth to the county, a 4.1-percent annual growth rate. Despite the recent decrease in oil shale activities, the economy still shows some signs of growth.

EMPLOYMENT

Recent statistics (refer to Table 9) for Uintah County show that more than 98 percent of local wage and salary employment is nonfarm, with about 14 percent employed in Federal, State, and local governments (USDC, Bureau of the Economic Analysis, 1983). Mining and tourism are the most important private industries in Uintah County. Mining directly accounts for about 21 percent of local employment. Tourism directly accounts for portions of the transportation, retail trade, and services sectors which comprise 48 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export industries contributes to local income and employment. The Mesa County, Colorado, economy is well diversified with large construction, mining, retail, and service sectors. A total of 432 enrolled Ute tribal members are employed. Some 52 percent (462) of the potential Indian labor force (894) is unemployed. This is mainly due to the lack of economic opportunities on the reservation. A large share of the unemployed Utes have become discouraged and are no longer actively seeking work. Virtually all of the 432 employed tribal members work for either the tribe, Bureau of Indian Affairs, or a tribal enterprise. The tribe lists fewer than 10 Ute members currently working in the oil and gas

industry (USDI, BLM, 1983).

The geophysical exploration which has been conducted in the WSA has generated some temporary local employment and income. Eleven oil and gas wells have been drilled in the WSA in recent years. This drilling has generated an estimated 16.5 work years of employment over the past 4 years, some of which represent local employment.

TABLE 9
1982 Income and Employment
Uintah County, Utah

Industrial Sector	Income (\$1,000)	Employment (Jobs)
Agriculture	3,888	136
Total Agriculture	3,888	136
Nonagricultural		
Private Industry		
Ag. Services, Forest, Fish	227	24
Mining	61,842	2,042
Construction	19,025	840
Manufacturing	3,127	177
Transportation and Public		
Utilities	15,787	657
Wholesale Trade	9,654	406
Retail Trade	14,695	1,334
Finance, Insurance and		
Real Estate	2,754	185
Services	49,568	2,691
Other		
Total Private Industry	176,679	8,356
Government		
Federal Government	5,710	373
State and Local Government	11,947	914
Total Government	17,657	1,287
Total Nonagricultural	194,336	9,643
Total Agricultural and Nonagriculture	198,224	9,779

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

Note: Because of rounding, numbers are not additive. Total and percentage income figures include wage, salary and proprietors' income. Total employment figures include wage, salary and proprietors' employment, whereas the employment percentage figures include only wage and salary employment.

INCOME

Income in Uintah County is shown on Table 9. Total income in Mesa County, Colorado, is much larger, at \$851,126 for 1981. Past activities in the WSA which are of local economic consequence include mineral exploration and production and livestock production. Table 10 summarizes current local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

Oil and gas activities within the Winter Ridge WSA boundaries have brought some income to

the area. At a lease fee of up to \$3 per acre, about \$101,094 in Federal oil and gas lease revenues are generated each year within the WSA. In addition, royalty payments of up to about \$50,000 per year are generated by the existing gas production in the WSA. One-half of these monies are returned to the State of Utah which then reallocates these revenues to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

TABLE 10
Local Sales And Federal Revenues

Source	Estimated Annual Income (Sales) ¹	Estimated Annual Federal Revenues
Oil and Gas Leases	\$30,000 maintenance Less than \$350,000 value	\$101,094 lease fees Less than \$50,000 royalties
Mineral Production	None	None
Livestock Grazing	\$56,500	\$3,164
Woodland Products	Insignificant	None
Recreational Use	Less than \$1,784	None
Total	Less than \$438,284	up to \$154,258

Sources: BLM Files, 1974; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total multiplier effect local income that would be generated by these expenditures.

Annual maintenance on the existing gas wells, which need relatively little servicing, is estimated to be about \$3,000 per well, contributing a total of \$30,000 per year to the local economy. The value of the gas produced from the existing gas wells is estimated at up to \$350,000 per year.

Three livestock operators have a total grazing privilege of 2,260 AUMs within the WSA. If all this forage were utilized, it would account for \$45,200 of livestock sales and \$11,300 of ranchers' returns to labor and investment. Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 2,260 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$3,164 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

Some woodland products are harvested from the WSA; however, the harvests have been small and are insignificant to the local economy and only of minor significance to those involved in the harvest.

The WSA's nonmotorized recreational use is minimal and related local expenditures are not considered to be significant. The WSA's motorized recreational use is moderate, associated primarily with hunting. Related local expenditures are well distributed and are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Winter Ridge WSA is estimated as about 435 visitor days per year. Only a portion of the \$1,784 expenditures for recreational use of the WSA contribute to the local economy of Uintah, Grand, and Mesa Counties.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These estimates were based on literature studies and known mining (including gas production)

activities in the vicinity of the WSA. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources. It is assumed that the existing withdrawal from mining claim location would remain in effect.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

This alternative represents the current management situation. The major changes that could occur in the area would be related to continued exploration and development of oil and gas, tar sand, and oil shale resources. The area would be open to leasable mineral resource use and development without restrictions for wilderness protection. The degree of future development is unknown but probably would be high because of the presence of demonstrated reserves, favorable economies for gas, and interest in improving and using technologies for oil shale and tar sand recovery. Major adjustments could occur in the area in terms of naturalness, wilderness values, and possibly wildlife protection. This would be due to extensive impacts as a result of energy exploration and development. The following is a worst-case analysis based on the assumption that leasable minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; oil shale, 672 acres; and tar sand 5,300 acres. These figures total 6,132 acres. It is assumed that, of this total, about 500 acres could be directly involved in energy operations at any one time. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed as a Class II area under the PSD regulations. Disturbance of 6,132 acres would result in moderate increases in fugitive dust emissions; however, Class I areas would not be directly impacted. Reduction in visual range is not expected to be significant due to actions within the WSA; however, these actions would contribute to potential visibility impairment by all future energy developments in the Uinta Basin (USDI, BLM, 1983).

GEOLOGY

Tar sand and oil shale resources could be developed. Because both resources are near the surface, it can be assumed that either surface mining for tar sand or LOFRECO in-situ mining (USDI, BLM, 1983) for oil shale would be the technology used in extraction of the resources.

Moderate impacts to geology are expected because surface disturbances associated with oil and gas, tar sand, and oil shale exploration and development activities could possibly occur on up to 35,300 acres.

SOILS

It is estimated that up to 6,132 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 6,132 acres would increase from 11,651 cubic yards/year to 16,556 cubic yards/year. Soil loss would decrease as reclamation occurred. However, the time required for complete reclamation cannot be determined but has been estimated as a minimum of 3 to 5 years for each disturbed site in the WSA. Under this alternative, maximum annual soil loss in the WSA would increase by approximately 4,905 cubic yards (11 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 6,132 acres disturbed by energy development could have a long-term effect on the vegetation resource within the WSA. About 90 percent of the area consists of pinyon and juniper woodland. If surface disturbance occurred mainly in the form of roads and drill pads, vegetation composition would be altered. Change in composition would also result from the planned vegetative treatments on 1,200 acres. All of these changes would tend to reduce existing stands of pinyon and juniper. This would result in increasing earlier stages of plant succession. The slow-growing tree cover would be replaced with faster-growing grasses, forbs, and shrubs.

No impacts to threatened and endangered plant species are expected since none are known to exist in the area, although impacts to potential habitat for three sensitive species could result.

WINTER RIDGE WSA

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality. The extent of surface disturbance from mineral and energy exploration and development could impact 6,132 acres under this alternative, with a soil loss increase by approximately 5,865 cubic yards per year. This would create a negative impact to the watershed, especially if surface disturbance were in the form of roads and drill pads throughout the WSA. Some additional minor short-term impacts to erosion and watershed would result from the proposed 1,200-acre vegetation treatment. In the long term, watershed conditions would tend to improve and erosion would be reduced as grasses and forbs stabilized the disturbed areas. However, if tar sand and oil shale were developed, it is likely that all or part of 12 springs would be lost. Water could also be lost to two wells.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

This alternative would have little impact on energy and mineral development. The entire area would remain open to leasable mineral exploration and extraction.

Oil and Gas

Oil and gas categories in the WSA would remain the same (25,314 acres in Category 1, 17,068 acres in Category 2, and 80 acres in Category 3). The wilderness stipulations on post-FLPMA leases would be lifted and there would be an additional 8,764 acres now unleased which would be available for simultaneous or competitive oil and gas leasing.

The WSA is considered to have scattered gas pools, anticipated to contain up to 60 billion cubic feet of natural gas. The gas resources could be explored and developed without concern for wilderness values.

Tar Sand and Oil Shale

About 15 percent (6,228 acres) of the Winter Ridge WSA is under application by four companies for the conversion of leases to combined hydrocarbon leases. These converted leases could be fully utilized without wilderness considerations. Additional tar sand exploration and development could occur on 29,072 acres under this alternative if the entire area were opened to hydrocarbon leasing in the future. The potential exists for about 500 million barrels of oil in-place with 375 million barrels estimated recoverable.

The tar sand resource has a relatively high probability of future development.

The entire WSA is part of an oil shale withdrawal that was created in the 1930s. Presently no oil shale has been leased with the WSA. The potential exists for thin beds or thicker beds of oil shale that would yield less than 15 gallons per ton of shale. This alternative would allow for the moderate probability of future oil shale leasing, without wilderness considerations.

Coal

Since there is a very low probability that recoverable coal exists in the Winter Ridge WSA, there would be no impacts related to this resource.

Locatable Minerals

Locatable mineral development would not occur within the Winter Ridge WSA. The entire WSA would remain closed to mining claim location. The potential small deposit of uranium/vanadium oxide could not be developed under this alternative.

WILDLIFE

The WSA provides important habitat for numerous species, including deer, elk, black bear, grouse, and partridge. These species would be adversely impacted in the short term by surface disturbance from mineral exploration and production. Oil and gas leasing categories would provide special stipulations to protect certain wildlife species. It would be assumed that similar stipulations would be developed for tar sand and oil shale leases in selected locations.

There is a potential for 6,132 acres to be disturbed by mineral exploration and development. If tar sand and oil shale resources are developed, the cover of pinyon and juniper would be lost and changes in topography would be expected. This would change some of the crucial habitat identified in Table 7 from good quality to poor quality. There would also be a short-term loss (3 to 5 years) of habitat on as much as 500 acres at any one time at varying locations as actual mining and rehabilitation are carried out. Species sensitive to disturbance could move out if important habitat is disturbed and might or might not return after activities ceased.

In the long term, forage for grazing or browsing wildlife species could increase based on reclamation and revegetation measures. The entire Book Cliffs range in east-central Utah provides similar habitat, but habitat is limited over southeastern Utah to areas of higher elevation. Most of the Uinta Basin, including the east Winter Ridge

WINTER RIDGE WSA

WSA, is now subject to some development pressure that could eventually result in negative effects on deer, elk, bear, mountain lion, and other wildlife species. This alternative would continue, in part, that development pressure. On the other hand wildlife benefits would be associated with the 1,200-acre vegetation treatments proposed for livestock.

FOREST RESOURCES

In the Winter Ridge WSA, there would be no significant effect on woodland products under this alternative, although up to 7,332 acres of pinyon-juniper forest could be lost due to potential disturbance from mineral exploration and development (6,132 acres) and livestock management (1,200 acres). This impact would be considered minimal because of the availability of similar resources outside the WSA, low current demand and remoteness of the area.

LIVESTOCK AND WILD HORSES

Domestic livestock grazing would continue as authorized in the Book Cliffs RMP. The 2,260 AUMs currently allocated within four allotments are utilized by three livestock permittees. The potential exists for 6,132 acres to be disturbed by mineral exploration and development. In the short term, this could reduce the number of AUMs available, especially if disturbance were in the form of roads and drill pads throughout the WSA. On the other hand, the opportunity to increase forage by 180 AUMs could be realized by the planned 1,200-acre vegetation treatments that would be allowed under this alternative. Other new livestock facilities, such as the proposed five new reservoirs, would be allowed without concern for wilderness values, and these would aid in livestock distribution and management.

If tar sand and oil shale resources are developed, standard rehabilitation practices would be expected in the long term to re-establish sufficient forage to maintain existing livestock numbers. Depending on rehabilitation success, available forage could increase over existing conditions after 3 to 5 years on up to 500 acres at varying locations as actual mining and rehabilitation were carried out. This could eventually result in an increase in permitted animals. The exact amount of this long-term increase, if any, is unknown.

The wild horse herd would not have the protection provided by wilderness designation. Development of tar sand and oil shale could adversely affect the horses, resulting in reduction or loss of the herd.

VISUAL RESOURCES

Visual values in areas affected by the estimated 7,332 acres of surface disturbance from energy development and livestock management would be negatively impacted. VRM Class III objectives would be implemented over 60 acres and Class IV over 42,402 acres. Even after rehabilitation, some permanent localized degradation would be expected. If roads, drill pads, tar sand mining, and oil shale development are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. Class III and IV management acreage could receive some long-term visual impacts, with specific local areas being affected to a significant degree.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 7,332 acres of surface disturbance by mineral development and livestock management under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in the disturbed area. The overall effect on cultural resources is unknown. The 26 archaeological sites in the WSA, including two having scientific value and covering 5 to 7 acres, would not have the added protection of wilderness designation.

RECREATION

The entire 42,462 acres (including 30.8 miles of roads and ways) would remain open to ORV use. Presently, ORV use is related largely to energy exploration and livestock management. New roads would be expected and would facilitate additional vehicle access.

Primitive recreation values would be foregone in those areas where potential surface-disturbance activities would occur. If roads and drill pads are located throughout the area, primitive recreational opportunities would be lost in the area altogether. Recreational use of the area is low, with hunting being the most popular (385 hunter days per year). Under this alternative, recreation use would largely be determined by availability of big game. Other recreation activities would probably remain about the same, but could increase slightly each year due to Statewide population increases. Based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At

WINTER RIDGE WSA

this rate, overall recreation use is expected to increase from 435 current visitor days per year to about 650 at the end of 20 years.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be under the existing Book Cliffs RMP. Expected mineral and energy exploration and development could disturb an estimated 6,132 acres. An additional 1,200 acres of vegetation treatments for livestock also could occur. Naturalness values now existing could be impacted by this disturbance on a total of 7,332 acres. Some primary impacts now existing as a result of recent activities on pre-FLPMA leases would continue and increase, with permanent imprints, such as roads, drill pads, and mining. These permanent imprints would be irreversible. The related surface disturbance would result in a significant loss of naturalness and opportunities for primitive and unconfined recreation throughout the area. Loss of natural values on lands directly impacted would have negative influence on surrounding areas in the WSA as well.

Opportunities for solitude could be adversely impacted by the sights and sounds of operations within and adjacent to the WSA while operations were ongoing. Hunting is the most popular recreation activity and would be highly influenced by impacts to wildlife and their habitat. The small wild horse herd and the potential habitat for sensitive plant species are special features that would not receive the added protection of wilderness designation.

LAND USE PLANS AND CONTROLS

Not designating wilderness would be in conformance with the intent of Uintah County's policy to develop energy resources. Plans of other agencies also would not be affected because management would continue as at present. No wilderness designation in the Winter Ridge WSA would be consistent with the BLM Book Cliffs RMP.

This alternative would be consistent with State of Utah plans and policies which emphasize economic return.

SOCIOECONOMICS

Without designation as wilderness, the Winter Ridge mineral resources could be fully developed. This would be beneficial to both the local and the regional economy. An increase in the potential for development of gas, tar sand, and oil shale resources is considered likely, but could contribute to the boom-bust economic effects recently seen in western Colorado associated

with oil shale development. There would be no loss of leasable acreage with significant future economic potential. Oil and gas lease revenues and royalty payments as shown on Table 10 would continue with half of these revenues going to the State. An additional 8,764 acres could be leased in the future to bring additional income from oil and gas lease Federal revenues estimated at up to \$26,292 in annual lease fees and the possibility of about \$15,000 in annual royalty payments. Further increases could be achieved through more drilling on existing oil and gas leases.

This alternative would tend to encourage development of energy resources and would positively impact the economies of both Vernal and Grand Junction. It also could result in employment for a few members of the Ute Indian Tribe. There would not be a loss of local employment or income as a result of this alternative. New leasing for tar sand and oil shale would add to both income and Federal revenues. If the tar sand and oil shale in the WSA were developed it would lead to a significant increase in employment and income for Uintah County and, to a lesser extent, for Mesa County. The probability of economic development of minerals within the WSA is relatively high.

There would be no livestock-related economic losses because the existing grazing use (2,260 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present. The proposed reservoirs and 1,200 acres of vegetation treatments that would produce 180 AUMs of new allocated forage could lead to \$3,600 of livestock sales and \$900 of ranchers' returns to labor and investment. Collection of livestock grazing fees (\$1.40 per year) would continue. The additional 1,200 acres of forage that would be produced by proposed new range improvements and allocated to livestock under this alternative would increase Federal revenues by \$252 annually. About 50 percent of the increased revenues would be returned to the local BLM office for use in range development projects.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase by only 215 visitor days per year at the end of 20 years, and overall recreation-related expenditures average only \$4.10 per visitor day, the recreation-related expenditures of up to \$882 per year attributable to

the WSA would likely not be significant to the local economy. Development of mineral resources in the WSA could possibly reduce the big game population and hunter success. This would reduce the number of hunters and hunter-related expenditures, but the local economic effects still would be insignificant.

All Wilderness Alternative (42,462 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 42,462-acre area would be related to its closure to new mineral leasing, closure to ORV use, and elimination of planned reservoirs and vegetation projects for livestock.

For the following analysis, it is assumed that some of the existing pre-FLPMA oil and gas leases would not expire before production of commercial quantities. It is also assumed that leases on 6,228 acres would be converted to combined hydrocarbon leases with nonimpairment stipulations. Future additional leasing of oil and gas, as well as any other mineral resource leasing, would not be allowed. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because potentially disturbed areas would be smaller than under the No Action Alternative (160 vs. 7,332 acres), the impacts from development and surface disturbance on air quality, geology, vegetation, and forest resources would be insignificant for the All Wilderness Alternative when compared to the No Action Alternative. Wilderness designation would provide additional protection to these resources. Other effects on resources due to changes in management are discussed below.

SOILS

The soil resource could benefit from the All Wilderness Alternative because of the reduced likelihood of surface-disturbing activities.

Assuming that all disturbance would occur in areas with moderate erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on 160 acres would increase from 304 cubic yards/year to 432 cubic yards/year. However, soil loss would decrease as reclamation occurred. Under this alternative, maximum annual increase in soil loss from surface disturbance in the WSA would be approximately 128 cubic yards, compared to 4,995 cubic yards under the No Action Alternative. This would be 4,777 cubic yards less than the No Action Alternative.

VEGETATION

The vegetation composition would basically remain as now exists. Any sensitive plant species that may be present in the WSA would be protected because disturbances would be limited.

WATER RESOURCES

Impacts to water interrelate closely to soils. Where surface disturbance occurs, increased sediment yield can affect surface water quality. Surface disturbance from mineral and energy exploration and development could impact 160 acres under this alternative. Because of the minimal area affected, there would be no significant change from the current situation and water resources would not be impacted.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Designation of the WSA would have limited impact on exploration for oil and gas. Post-FLPMA leases (currently covering 4,056 acres of the WSA) would be subject to wilderness stipulations and 8,764 acres could not be leased. Most of the Winter Ridge WSA is covered by pre-FLPMA leases (29,642 acres) with prior and existing rights which would allow for continued exploration and development without wilderness restrictions. Gas discovery has occurred on some of these leases and on leases adjacent to the WSA. Undiscovered gas resources could not be explored or produced on the 8,764 acres not leased. Therefore, roughly 30 percent of the estimated 18 billion cubic feet of natural gas which is potentially recoverable in this WSA would be foregone with wilderness designation. Thus, it is concluded that resource exploration and development within the WSA would occur in the future due to pre-FLPMA leases, but that the full potential would not be realized.

Tar Sand and Oil Shale

The potential for the occurrence of tar sand exists within the WSA, with more than 500 million barrels of oil in-place. About 375 million barrels are considered recoverable and could be foregone. On a practical basis, the 6,228 acres converted to combined hydrocarbon leases with nonimpairment stipulations could not be utilized, thereby possibly limiting the scale of the lessees' proposed projects on these and adjacent lands outside of the WSA. Combined hydrocarbon leases within the WSA would comprise about 28 percent of the total area involved in the tar sand project.

WINTER RIDGE WSA

Also, oil shale, with less than 15 gallons per ton of shale, exists in the WSA. About 14 million barrels of oil are estimated recoverable and could be foregone. The WSA has not been leased for oil shale and leasing could not occur under this alternative.

Coal

There is no recoverable coal underlying the WSA; therefore, no development of recoverable coal would be foregone.

Locatable Minerals

Since the area already is withdrawn from mining claim location, no loss of locatable minerals would be foregone as a result of wilderness designation.

WILDLIFE

Wildlife would benefit from wilderness designation due to the reduction of mineral-related surface-disturbing activities on 5,972 acres as compared to the No Action Alternative. Most impacts, if occurring, would be short term while exploration and production activities were ongoing. Species sensitive to disturbance could move out of the area and might not return after activities have ceased; however, this is unlikely because less than .01 percent of the WSA would be disturbed under this alternative. Over the long term, forage for wildlife species could improve slightly on 160 acres, depending on revegetation.

No separate wildlife management facilities have been proposed for the WSA. The potential 1,200-acre vegetation treatment for livestock, which also would have potential benefits to wildlife, could not occur under this alternative.

Impacts relating to this alternative would generally be favorable for wildlife. Wilderness designation would reduce or minimize access roads, fence construction, and other forms of man-made intrusions. This would probably maintain escape cover for big game species. This same vegetation would maintain habitat quality for a variety of small birds and mammals inhabiting the area. It would provide a more pristine and solitary environment important to many species. It would also reduce hunter access but could improve the quality of the hunting experience (i.e., more rustic) since vehicle travel would be restricted.

This designation, however, would provide some undesirable impacts to wildlife. It would preclude any form of habitat improvement and/or vegetation conversion projects. No water developments to aid in distribution other than springs could be completed nor would any pinyon-juniper conversions be allowed. This could have limiting conse-

quences to future big game management objectives. It could be particularly objectionable to future elk management since long-range goals are designed for increased populations in the Book Cliffs, and increased forage production through pinyon-juniper conversion would be a vital part of meeting this objective.

In the long term, wilderness designation could hamper future management activities related to big game populations (especially deer) should reductions of those populations be necessary. Without adequate access into a given area, it usually becomes difficult to get suitable harvest in many instances. Often it can become necessary to provide increased access in an area to get the desired harvest.

It also is pointed out that wilderness designation generally favors climax vegetation conditions. Such conditions usually do not enhance the area for wildlife. This is particularly true for big game species. Proper manipulation of the successional patterns of various plant communities is a major component of terrestrial wildlife habitat management (Tueller and Monroe, 1975).

Any resting areas for peregrine falcon and bald eagles would be protected.

LIVESTOCK AND WILD HORSES

Present levels of domestic livestock grazing would continue as authorized in the Book Cliffs RMP. The 2,260 AUMs currently allocated in the WSA would remain available for livestock.

Within the wilderness area, existing range improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. Future roads or other livestock handling facilities could be prohibited to protect wilderness values. The potential vegetation treatment project with 180 additional AUMs of forage production and four proposed livestock reservoirs would not be allowed. This would limit the expansion and distribution of livestock use in the area.

The existing wild horse herd would not be affected.

VISUAL RESOURCES

This alternative would maximize preservation of scenic quality, limit landscape modification, and limit introduction of structures. Even so, valid pre-FLPMA mineral entry is a permitted use that would continue to create modifications and visual impacts.

CULTURAL RESOURCES

The 26 archaeological sites in the WSA, including two having scientific value and covering 5 to 7 acres, would benefit slightly from the All Wilderness Alternative.

Designation would benefit cultural resources by reducing the probability of actions within the WSA that would be disturbing to cultural resources.

There is a low potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities, creating an overall positive impact.

RECREATION

The entire 42,462 acres (including about 30.8 miles of roads and ways) would be closed to ORV recreational use. This would not be a significant loss of ORV opportunity because this activity is presently very low within the WSA, except as related to energy exploration, livestock management, and hunting access. The latter would be the primary recreation use affected.

Primitive recreation values could be enhanced through designation. By increasing public awareness of the area, designation could result in increased primitive recreation use of the WSA. However, judging from the site characteristics of the Winter Ridge WSA, population distribution about the site, and availability of similar sites, it is possible that primitive recreation use may not increase appreciably; therefore, it may not offset the loss of the 650 visitor days of vehicular-related use projected to occur without designation.

Overall, wilderness designation could have a generally positive effect for preserving long-term recreational opportunities, but valid existing rights for mineral activity, if exercised, would continue to have a negative impact on recreational pursuits. Other than size, numerous other areas are available that have recreational opportunity similar to this area. Scenic quality is not outstanding and has no outstanding attraction.

WILDERNESS VALUES

Application of the "Wilderness Management Policy" would provide the basis for preservation of the identified mandatory wilderness characteristics of size (42,462 acres), naturalness (35,835 acres), and opportunities for solitude (31,897 acres). No areas were identified that contained

outstanding opportunities for primitive and unconfined recreation.

Currently, these mandatory wilderness characteristics are being impacted by the development of pre-FLPMA oil and gas leases. With the establishment of wilderness, expiring leases would not be renewed and greater surface protection would be afforded; however, prior and existing rights would continue to result in some disturbance on an estimated 160 acres throughout the WSA.

Preservation of the small wild horse herd and the habitat for the sensitive plant species are special features that would be included.

LAND USE PLANS AND CONTROLS

Designation of wilderness would not conflict directly with any existing land use plan. However, the Uintah County planning staff stated that it would conflict with present land use of the area which accommodates oil and gas development. Designation would not be consistent with Uintah County's goal of encouraging energy and mineral development and maintaining livestock uses. Designation of the Winter Ridge WSA as wilderness would constitute an amendment of the BLM Book Cliffs RMP. Designation would also result in exchange of State land in-holdings as discussed in the Description of the Alternatives section.

SOCIOECONOMICS

The Winter Ridge WSA is geologically favorable for natural gas production. Oil and gas developments could take place on pre-FLPMA leases and, to a lesser extent, on post-FLPMA leases if wilderness values were not degraded. The existing operations of 10 producing wells in the WSA would continue, with income and revenue as shown on Table 10 continuing as well. Some added drilling could occur on pre-FLPMA leases, but exploration and development in the WSA would be constrained. The probability of a company conducting exploration in a post-FLPMA lease area under wilderness criteria would be reduced with uncertainty of development. In 1980 about 0.001 people per acre were employed in the exploration and production of oil and gas from the most productive region in Uintah County. The worst-case implication is that up to about 20 jobs would be foregone with designation; however, there are numerous existing leases in the vicinity that could still be developed. Therefore, the potential loss of local employment would probably be unnoticeable.

No new jobs would be created for work in the

WSA. Although some of the labor requirements come from workers temporarily moving into the area, many workers are hired from Vernal and Roosevelt, Utah, and eastern Mesa County, Colorado. Many oil and gas field services are provided by local businesses, and some of the wages earned by the oil and gas workers circulate through the local economy. Exploration and development of an area's oil and gas resources is the most labor intensive phase of oil and gas production, but is of relatively short duration. Reduced activity on oil and gas leases in the WSA would affect primarily this phase of the work. Maintenance of existing gas wells in the WSA requires minimal labor and would remain unaffected.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 4,056 acres now under post-FLPMA oil and gas leases could cause an eventual loss of \$12,168 annually to the Federal treasury, if current leases expired after designation. The loss of 8,764 acres potentially available for oil and gas leases would cause a potential loss of \$26,292 annually in lease fee payments to the Federal treasury. In each case, the State of Utah would have received half of these revenues. No royalty payments from these leases foregone would be received.

Designation would have an adverse impact on the development of other hydrocarbon resources. Future market conditions, the cost of new tar sand and oil shale technologies, and the potential employment associated with these industries are uncertain; however, likely development potential exists in the WSA. Therefore, the related socio-economic benefits (of unknown magnitude) which are expected at some time in the future would be foregone with wilderness designation.

Average livestock use in the WSA is estimated to be 2,260 AUMs of forage consumed annually. Income from sales and the return of the ranchers' labor and investment total an estimated \$4,500 annually. With designation, current livestock use would not be expected to increase. New rangeland improvements would be allowed only if they were primarily for the purposes of rangeland and/or wilderness resource protection and management. Wilderness designation could place greater restrictions on operations within the WSA; however, increased costs would not be significant. Wilderness designation would result in nonattainment of 180 AUMs expected from proposed vegetation treatments, with an associated \$252 in grazing fees annually foregone.

Partial Wilderness Alternative (28,044 Acres)

The major activities that would occur in the designated portion of the Winter Ridge WSA for this alternative are the same as described for the All Wilderness Alternative. For the nondesignated portion, management would be as described for the No Action Alternative. The specific actions that would take place within the 28,044-acre area designated as wilderness and the 14,418-acre nondesignated area are discussed in the Description of the Alternatives section.

It is assumed that the entire WSA would continue to remain closed to mining claim location. It is assumed also that some but not all of the existing oil and gas leases in the designated portion would expire before production of commercial quantities, and that tar sand conversion areas would be converted with the stipulation of no surface occupancy. Any expired oil and gas leases in the designation portion would not be renewed and future leasing of oil and gas or combined hydrocarbons would not be allowed.

It is assumed that, within the designated area 106 acres and, within the nondesignated area, 2,082 acres would be disturbed some time in the future due to oil, gas, and tar sand exploration and development. Overall, 2,188 acres of surface disturbance would occur within the WSA, 5,144 acres less than under the No Action Alternative and 2,028 acres more than with the All Wilderness Alternative. Appendix 10 lists the surface disturbance assumptions and estimates for the WSA.

The analysis of the No Action Alternative, based on 7,332 acres of surface disturbance and development of the PR Spring STSA within and adjacent to the WSA, shows that full development of potential resources with associated surface disturbance would not significantly affect geology, water, forest, and cultural resources. Therefore, these resources would not be significantly affected by this Partial Wilderness Alternative.

Restrictions on management and development methods within the WSA would result in essentially the same kinds of impacts to air quality, soils, vegetation, water sources, mineral and energy resources, wildlife, livestock grazing, wild horses, and land use plans as described for the All Wilderness Alternative. The following analysis describes the differences in the degree or amount of impact between the Partial Wilderness, No Action, and All Wilderness Alternatives.

WINTER RIDGE WSA

AIR QUALITY

Fugitive dust emissions would be expected to occur at about half the level of the No Action Alternative and at a level considerably less than the All Wilderness Alternative.

SOILS

Post-FLPMA leases would not be developed except on the 14,418 acres dropped from consideration. Maximum annual increase in soil loss would be about 1,751 cubic yards compared to 4,905 yards under the No Action Alternative.

VEGETATION

Under this alternative, the vegetation composition within the area designated as wilderness would basically remain as now exists. The habitat for the sensitive plant species would not be within the designated area but would be protected as a result of existing statutes.

Assuming that tar sand and oil shale resources are developed on the 14,418 acres excluded from consideration as wilderness, a major change in vegetation composition would be expected. The slow-growing tree cover would be replaced with faster-growing grasses, forbs, and shrubs.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

The impacts would be similar to the All Wilderness Alternative, except 14,418 additional acres would be available for less restrictive conventional oil and gas production. The significant difference is that 1,774 acres of post-FLPMA leases would not be subject to the nonimpairment criteria and 2,186 acres could be leased that currently are not. This alternative would have little impact on the 10,458 acres of pre-FLPMA leases that fall within the 14,418 acres which, even under the All Wilderness Alternative, could be developed regardless of the nonimpairment criteria so long as the development is not undue and is necessary.

The 28,044-acre area that would be designated wilderness under this alternative is covered by BLM's oil and gas category system. Category 1 contains 10,896 acres; Category 2, 17,068 acres; and Category 3, 80 acres. The area that would be designated wilderness would be placed in Category 4 status with no new leasing. There are approximately 21,466 acres of oil and gas leases in the area that would be designated wilderness;

19,184 acres are pre-FLPMA and 2,282 acres are post-FLPMA. Activities on these leases would occur subject to the stipulations issued at the time of leasing.

An estimated potential resource of up to 40 billion cubic feet of natural gas falls within the area that would be designated as wilderness under this alternative. Of this amount, 12 billion cubic feet of natural gas are estimated to be recoverable. Except on pre-FLPMA leases, this would be foregone; however, the undesignated area would allow recovery of an estimated 6 billion more cubic feet of natural gas than with the All Wilderness Alternative.

It is concluded that, due to the nature of the potential deposits, the high certainty that they exist, and the high likelihood for exploration and development activities, this alternative is expected to result in a significant loss in recovery of the natural gas resource.

Tar Sand and Oil Shale

Approximately 25,060 acres of the PR Spring STSA are within the portion of the WSA that would be designated wilderness. About 2,628 acres of this amount presently are under lease conversion application. Although it is assumed that conversion applications would be approved with the nonimpairment stipulation of no surface occupancy, in practicality the leases could not be developed. Future leasing would not be allowed in the designated 28,044-acre area. In this area, the potential for development of 25,060 acres of tar sand with an estimated 248 million barrels of recoverable oil would be foregone. Otherwise, the potential for this resource is high within the WSA, and the likelihood for production is high. In the nondesignated area, the production of an estimated 127 million barrels (recoverable) would be possible, as compared to no production in the All Wilderness Alternative.

Due to no existing oil shale leases and the impairing nature of such development, no oil shale development would be possible under the All Wilderness Alternative; however, under this Partial Alternative, 14,418 acres and an estimated 4 million barrels of recoverable shale oil resource could be developed. This alternative would provide for development of an estimated 29 percent of oil shale resource in the Winter Ridge WSA. About 10 million barrels of recoverable oil shale resource would be foregone in the area designated as wilderness.

Locatable Minerals

All lands would continue to be closed to prospecting and locatable mineral development. Because of this and because economic considerations for uranium (e.g., low potential, depressed market, etc.) are unfavorable, it is unlikely that exploration or development will occur. Therefore, this alternative would not affect recovery of significant amounts of uranium or other locatable minerals.

WILDLIFE

Impacts under this alternative would be very similar to those described under the All Wilderness Alternative. Areas with the best potential for elk habitat improvement would be within the area designated as wilderness. This is similarly true for hunting opportunity and general habitat conditions.

If tar sand and oil shale resources are developed on the 14,418 acres dropped from consideration, the cover of pinyon and juniper would be lost and changes in soils would be expected. This would change the crucial habitat in some locations from good quality to poor quality. There would also be a short-term loss of habitat on as much as 500 acres (3 to 5 years) at varying locations as actual mining and rehabilitation are carried out.

LIVESTOCK AND WILD HORSES

The effect of designation of 28,044 acres of the WSA as wilderness on domestic livestock grazing would be essentially the same as with the All Wilderness Alternative. Of the 2,260 AUMs allocated, 1,704 AUMs would be within the designated portion of the WSA and 556 AUMs within the nondesignated portion. Development of future roads, reservoirs, or other livestock management facilities for use with 1,704 AUMs in the designated portion could be restricted to preserve wilderness values. Effects on the management of livestock grazing is expected, due primarily to constraints that would prevent increasing forage by about 180 AUMs and limit improved distribution of livestock.

With tar sand and oil shale resources developed on the 14,418-acre area not designated as wilderness, vegetation would be removed. Standard rehabilitation practices would be expected to re-establish sufficient forage to maintain existing livestock numbers. There would be a short-term loss of forage on up to 500 acres for 3 to 5 years at varying locations as actual mining and rehabilitation are carried out. Depending on rehabilitation success, available forage could increase over present conditions. This could result in a long-term increase in permitted animals on the area

not designated. The exact amount of this increase, if any, is unknown.

The existing wild horse herd would be protected in the area designated as wilderness.

VISUAL RESOURCES

Because total surface disturbance in the WSA would be 2,082 acres with this alternative as opposed to 7,332 acres with No Action and 160 acres with All Wilderness, the impact on visual resources would be substantially less than under the No Action Alternative, but significantly more than under the All Wilderness Alternative. In the 28,044-acre portion recommended for designation, 106 acres of surface disturbance could result from mineral exploration and development. Although mitigative measures would be applied to minimize visual contrast created by mineral-related surface disturbance, visual quality would be degraded and VRM Class I management objectives would not be met during the short term on disturbed areas. Even after rehabilitation some permanent localized degradation could be expected. If roads for development of pre-FLPMA leases (worst-case analysis) were extensive, VRM Class I objectives might not be met on large portions of the designated area. Because the potential for development of pre-FLPMA leases is high, visual quality would probably be reduced in the designated area as a whole. An additional 1,922 acres in the nondesignated portion of the WSA would be disturbed and would not meet VRM Class II objectives. Overall, disturbance within the WSA would significantly affect visual resources in the WSA as a whole throughout the period of energy development and production.

RECREATION

Impacts on recreational values and opportunities for the 28,044-acre area that would be designated as wilderness would be as described in the All Wilderness Alternative. Little impact on ORV recreational use would be expected due to the lack of such activity in the area; however, approximately 10 miles of ways within the designated portion of the WSA would be closed to ORV use.

In the area that would not be designated (14,418 acres), little change in recreational use is expected due to the limited recreational values.

WILDERNESS VALUES

Application of the "Wilderness Management Policy" for the Partial Wilderness Alternative would foster the preservation of the identified mandatory wilderness characteristics of size (28,044 acres), naturalness (26,418 acres), and opportunities for solitude (22,624 acres). No areas were

identified that contained outstanding opportunities for primitive and unconfined recreation.

Currently, these mandatory wilderness characteristics are being affected by the development of pre-FLPMA oil and gas leases. With the establishment of wilderness, expiring leases would not be renewed and greater (but not fully complete) surface protection afforded.

The small wild horse herd would be preserved. Habitat for the sensitive plant species would not be included in the designated wilderness.

Tar sand and oil shale resources could be developed on 14,418 acres dropped from wilderness consideration under this alternative. Because both resources are near the surface, it can be assumed that either surface mining for tar sand or LOFRECO in-situ mining for oil shale would be the technology used in extraction of the resources. If development does occur, all wilderness values would be lost in the area not designated wilderness.

LAND USE PLANS AND CONTROLS

The designated 28,044-acre portion of this alternative would relate to the Land Use Plans and

Controls section as described for the All Wilderness Alternative.

SOCIOECONOMICS

Designation as wilderness would reduce the current amount of oil and gas exploration in the area. This would result in a small economic impact to both the Grand Junction and Vernal areas. The exact amount of this impact is not known.

Tar sand and oil shale could not be developed on 28,044 acres. This could result in a major future economic loss to Uintah County. An estimate of the value of these resources is not available.

Approximately \$252 would be lost each year in livestock grazing fees because proposed vegetation manipulation projects could not be completed.

Overall, the socioeconomic impacts resulting from the Partial Wilderness Alternative are expected to be about 25 to 30 percent less than the No Action Alternative and about 20 percent more than the All Wilderness Alternative. This is a judgement estimate based primarily on the general differences in opportunities for development of gas, tar sand, and oil shale resources.

BIBLIOGRAPHY

- Behle, William H. 1975. *Birds of Northeastern Utah*. p.46.
- Campbell, Jack A. and Ritzma, Howard R. 1979. *Geology and Petroleum Resources of the Major Oil-Impregnated Sandstone Deposits of Utah*. August 1979. Utah Geological and Mineral Survey, Salt Lake City, Utah.
- Cashion, W.B. 1973. *Geologic and Structure Map of the Grand Junction Quadrangle, Colorado and Utah*. (Map 1-736) U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Cashion, W.B. 1981. "Result of Core Drilling in the Mahogany Zone and Some Adjacent Beds of the Green River Formation, Winter Ridge Area, Southeastern Uinta Basin, Utah." Open-File Report 81-175. U.S. Department of the Interior, Geological Survey, Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Institute of Outdoor Recreation and Tourism, College of Natural Resources, Utah State University, Logan, Utah. pp. 25-27.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C.
- Elston, P.E. and Shoemaker, E.M. 1969. "Late Paleozoic and Early Mesozoic Structural History of the Uncompaghre Front" in *Guidebook, Four Corners Geological Society*, Third Field Conference.
- Environmental Associates. 1979. "Visual Resource Inventory and Analysis of the Book Cliffs Planning Unit." Salt Lake City, Utah.
- Foster, Robert H. 1968. "Distribution of the Major Plant Communities in Utah." May 1968. Brigham Young University, Provo, Utah. 125 pp.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Karpowitz, James. 1982. *Quarterly Report-Book Cliffs Big Game Study*. Prepared for the U.S. Department of the Interior, Bureau of Land Management, Vernal District Office, Vernal, Utah.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Bureau Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. U.S. Department of the Interior, Bureau of Land Management. Denver, Colorado.
- Nicholson, Bob. 1982. "Planning Office Views on Winter Ridge WSA," (personal communication). November 1982. Uintah County Commission, Vernal, Utah.
- Petroleum Investment Company. 1981. *Oil and Gas Map of Eastern Utah Showing Tectonics and Regional Geology*. Salt Lake City, Utah.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by The Bureau of Land Management, The Vernal District, Utah*. October 1, 1982. Oak Ridge, Tennessee. 337 pp.
- South, D. W.; Nagle, J. C.; Nagle, J. W.; and Winter, R. C. 1983. *Regional Socioeconomic Analysis of Tar Sand Development in Utah*. July 1983. Argonne National Laboratory, Argonne, Illinois. 383 pp.
- Stone, D.S. 1977. "Tectonic History of the Uncompaghre Uplift" in *Rocky Mountain Association Geological Field Conference Guidebook*. Volume 1977. Denver, Colorado.
- Thornbury, William D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc., New York, London, Sydney. 428 pp.
- Tueller, Paul T. and Monroe, Leslie A. 1975. *Management Guidelines for Selected Deer Habitat in Nevada*.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of the Census. 1983. *General Social and Economic Characteristics, Utah, 1980 Census of Population*. June 1983. U.S. Government Printing Office, Washington, D.C.

WINTER RIDGE WSA

- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System, Employment by Type and Broad Industrial Sources, 1976-1980*. April 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1974. "Seep Ridge Planning Unit, Unit Resource Analysis" (unpublished document). Book Cliffs Resource Area, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. Utah State Office, Salt Lake City, Utah. 404 pp.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Management Policy." *Federal Register* Notice. September 24, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on the Public Lands." *Federal Register* Notice. Volume 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management, 1983. *Final Environmental Impact Statement on the Uinta Basin Synfuels Development*. February 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Utah Combined Hydrocarbon Leasing Regional Final Environmental Impact Statement*. Volume I. June 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Scoping the Utah Statewide Wilderness Environmental Impact Statement: Public Scoping Issues and Alternatives*. July 20, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984c. *Final Environmental Impact Statement on the Book Cliffs Resource Management Plan*. November 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984d. *Mineral Plats*. Vernal District Office, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1985. *Draft Environmental Impact Statement, PR Spring Combined Hydrocarbon Lease Conversion*. Scheduled for publication April 30, 1985. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Reclamation. 1975. *Salinity and Sediment Study, Upper Colorado River Basin, Utah, Colorado, Wyoming*. June 1975. Salt Lake City, Utah.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States*. (Map). Reston, Virginia.
- Utah Department of Employment Security. 1980. "Selected 'Annual Reports' (1970-1980)" (unpublished document). Salt Lake City, Utah.
- Utah Department of Employment Security. 1982. "Social Economics Information" (unpublished document). Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan, 1980 SCORP*. Salt Lake City, Utah. p. 157.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Van West, F.P. 1972. *Green River Oil Shale in Geologic Atlas of the Rocky Mountains*. Rocky Mountain Association of Geologists, Denver, Colorado.
- Welsh. 1979. *Illustrated Manual of Proposed Endangered and Threatened Plants of Utah*. U.S. Department of the Interior, Fish and Wildlife Service, and Bureau of Land Management, and U.S. Department of Agriculture, Forest Service. U.S. Government Printing Office, Washington, D.C. 317 pp.

Daniels Canyon WSA



DANIELS CANYON WSA

TABLE OF CONTENTS

INTRODUCTION	1
General Description of the Area	1
Specific Issues Identified in Scoping	1
DESCRIPTION OF THE ALTERNATIVES	2
Alternatives Considered and Eliminated from Detailed Study	2
Alternatives Analyzed	2
No Action Alternative (Proposed Action).....	2
All Wilderness Alternative	4
Summary of Environmental Consequences	7
AFFECTED ENVIRONMENT	7
Air Quality	7
Geology	7
Soils	7
Vegetation	7
Water Resources	9
Mineral and Energy Resources	9
Wildlife	12
Forest Resources	12
Livestock and Wild Horses/Burros	12
Visual Resources	13
Cultural Resources	13
Recreation	13
Wilderness Values	14
Land Use Plans and Controls	15
Socioeconomics	15
ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES	17
Analysis Assumptions and Guidelines for All Alternatives	17
No Action Alternative (Proposed Action).....	17
All Wilderness Alternative	20
BIBLIOGRAPHY	23

DANIELS CANYON WSA

(UT-080-414)

INTRODUCTION

General Description of the Area

The Daniels Canyon Wilderness Study Area (WSA) consists of 2,496 acres of public land contiguous to the Dinosaur National Monument in eastern Uintah County, Utah. The Daniels Canyon WSA is about 22 miles due east from the community of Vernal, Utah.

Major features include a portion of Daniels Canyon and Cub Creek. The WSA lies on the south edge of the Yampa Plateau, near the Utah-Colorado border. It is in the northeastern part of the Uinta Basin. The Uinta Basin is the scene of considerable energy development with oil and gas production, oil shale and tar sand projects, and a coal-fired power plant.

Vegetation in the WSA and vicinity is primarily pinyon-juniper forest intermixed with sagebrush.

The northern part of Uintah County is primarily Federal land administered by the BLM, National Park Service (NPS), and Forest Service (FS). Interspersed with the BLM-administered land are an average of four State sections per township. A small percentage of the land is privately owned, either by livestock interests or energy companies.

Elevations in the WSA range between 5,600 and 7,720 feet. The climate of the region is semiarid to arid. Because of the typically dry atmosphere, bright, sunny days and clear nights frequently occur. Temperatures range from about 90 degrees Fahrenheit (F) in the summer to as low as -36 degrees F in January. Precipitation averages 8.8 inches.

The WSA was dropped from wilderness study status by the Secretary of the Interior on December 30, 1982 due to its small size. As a result of a decision of the Eastern District Court of California (Sierra Club vs. Watt, No. Civil 5-83-035 LRK, dated April 18, 1985) it is in WSA status and is analyzed in this Environmental Impact Statement (EIS) in accordance with (1) general land use planning provisions of Section 202 of the Federal Land Policy and Management Act (FLPMA) and (2) BLM guidance that allows for wilderness consideration of areas of less than 5,000 acres if they are adjacent to land with wilderness potential administered by other Federal agencies.

Specific Issues Identified in Scoping

Public opportunity to review and comment on an

initial draft analysis of this area occurred in August 1982. Because of the 1982 decision of the Secretary of the Interior, the area was not among those listed in the brochure used for the 1984 EIS scoping meetings (USDI, BLM, 1984a), but the specific issues and concerns expressed earlier would apply. These are as follows:

1. *Comment:* Some residents believe that, because the WSA is contiguous to Dinosaur National Monument, if designated wilderness, the management of this small area would pass to the NPS. This means that the NPS would probably close the area to big game hunting, require possible livestock grazing reductions, and restrict development of any minerals or oil and gas resources.

Response: BLM considers the wilderness study process to be separate and distinct from the question as to whether BLM or NPS should administer the land. For the wilderness study, it is assumed that BLM would continue to manage the WSA whether or not it is designated wilderness. It is noted, however, that on February 6, 1985, the Secretary of the Interior had already recommended to Congress that the Daniels Canyon area is suitable for inclusion into the National Park System regardless of its wilderness status (Secretary of the Interior, 1985). However, no action by Congress has yet been taken. Either NPS management or BLM wilderness administration would result in management restrictions, particularly on mineral development.

2. *Comment:* The opportunity to build a road up Daniels Canyon would be foregone if this WSA is designated wilderness. In the 1960s, NPS proposed a new road to tie the Visitor Center and Quarry to the paved road on Blue Mountain to Harper's Point.

Response: The location of the potential road is not within the boundaries of the WSA.

3. *Comment:* A local rancher claims that all waters in Cub Creek and its tributaries (which includes Daniels Canyon) have been adjudicated to their ranch. The rancher has future plans for development of the spring and reservoirs.



Response: Any existing valid water rights would not be affected by wilderness designation; however, construction of reservoirs in a designated wilderness would not be allowed. There would be no effect on water rights or constraints on livestock projects if the area is not designated wilderness. A recent check of the water user file at the Uintah County Courthouse indicates that there are no private or individual filings for water in the Daniels Canyon WSA.

DESCRIPTION OF THE ALTERNATIVES

Alternatives Considered and Eliminated from Detailed Study

Transfer of several WSAs, including the Daniels Canyon WSA, to NPS administration in adjacent NPS units has been proposed (H.R. 1214, 1984). Such a transfer could occur in the future regardless of wilderness status.

Because of the possibility of transfer of management from the BLM to the NPS, the EIS could include analysis of both BLM and NPS management with and without wilderness designation of the WSA. However, because BLM could continue to manage the WSA without wilderness designation or could manage the WSA as wilderness in conjunction with a contiguous NPS-administered wilderness and because the outcome of the NPS wilderness proposals and H.R. 1214 are uncertain actions independent of the BLM wilderness review, alternatives for transfer of jurisdiction from BLM to NPS are not analyzed in this EIS. The EIS addresses the basic question of wilderness designation of BLM-administered lands and the resultant environmental impacts. Transfer of jurisdiction is considered by BLM to be a separate matter that would be evaluated on its own merits and could be implemented with or without wilderness designation.

It is noted that, in cases where lands contiguous to a BLM WSA are proposed as wilderness by another Federal agency, the "BLM Wilderness Study Policy" (USDI, BLM, 1982) requires the BLM in its Wilderness Study Report to determine whether: (1) the WSA would be a viable independent candidate for designation as wilderness if Congress does not designate the contiguous land; and (2) if the WSA were designated as wilderness, whether the BLM portion could be more effectively managed by the agency which administers the contiguous wilderness area.

BLM has determined that the Daniels Canyon WSA would not be a viable independent wilderness if adjacent NPS land is not also designated as wilderness. The question of which agency should manage the WSA to achieve overall management effectiveness will be addressed in the Wilderness Study Report. This decision will be based primarily on factors affecting both BLM and NPS jurisdictions (i.e. relative amounts of the total wilderness area administered by each agency, principal public ingress and exit points, agency staffing and workload in the region, and similar nonenvironmental items). Environmental differences, if any, would be due to variations in BLM and NPS mandates and policy (e.g., national parks are closed to hunting while public lands are not) rather than from wilderness designation. These differences would exist with or without wilderness designation, and therefore are not relevant to the analyses of impacts from wilderness designation.

No other alternatives were identified for this WSA with the exception of those analyzed.

Alternatives Analyzed

Two alternatives are analyzed for this WSA: (1) No Action; and (2) All Wilderness (2,496 acres). A description of each alternative follows. Where management intentions have not been clearly identified, assumptions are made based on management projections under each alternative. These assumptions are indicated in each case.

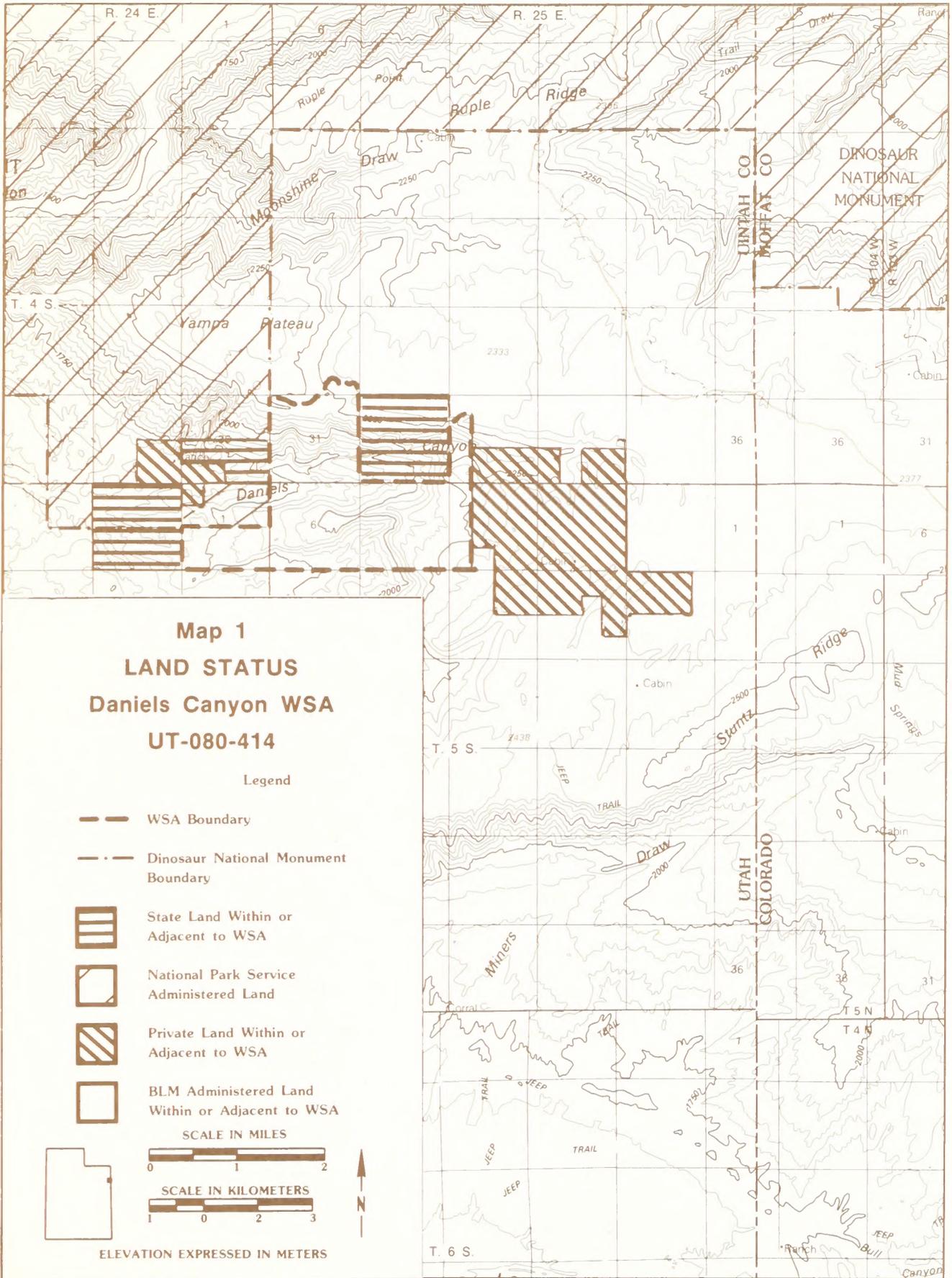
NO ACTION ALTERNATIVE (PROPOSED ACTION)

With this alternative, none of the 2,496-acre Daniels Canyon WSA would be designated by Congress as part of the National Wilderness Preservation System (NWPS). The area would continue to be managed in accordance with the Blue Mountain Management Framework Plan (MFP) (USDI, BLM, 1974b). No State or private lands are within the boundary of the WSA (refer to Map 1) but are adjacent to it. These adjacent lands have not been identified in the MFP for special Federal acquisition through exchange or purchase. These lands are analyzed as remaining under existing ownership.

The following are specific actions that would take place with this alternative:

- All acres would remain open to mining claim location, mineral sale, and mineral leasing with standard and special lease stipulations. Development work, extraction, and patenting could occur on any future claims. There are no mining claims pres-

DANIELS CANYON WSA



ently in the WSA. The seven existing oil and gas leases (2,176 acres) and new leases could be developed under leasing Category 1 (standard stipulations) on about 1,869 acres, Category 2 (standard and special stipulations) on about 160 acres, and Category 3 (no surface occupancy) on 467 acres. With this alternative it is assumed that any wilderness protection (nonimpairment) stipulations applied to the leases while the area is under wilderness review would be deleted if the area is not designated.

- The present domestic livestock grazing use of the 2,496-acre area of the WSA would continue as authorized in the MFP (127 Animal Unit Months [AUMs]). Existing developments of one brush fence, one spring development, and two reservoirs could be maintained by mechanical methods. New range developments could be implemented without wilderness considerations, but none are specifically planned by BLM.
- Developments for wildlife, water resources, etc., would be allowed without concern for wilderness values if in conformance with the Blue Mountain MFP, although none currently are planned.
- The 2,496 acres of the WSA, including about 2 miles of vehicular ways, would remain open for vehicular use in accordance with the MFP. New access could be developed.
- The entire 2,496-acre area would continue to be open to woodland product harvest. There is no harvest of forest products at the present time, nor is any planned.
- The entire area would continue to be managed under Visual Resource Management (VRM) Class II.
- Measures to control fire, insects, noxious weeds, or disease would be taken without concern for protecting wilderness values in instances that threaten human life, property, or high-value resources. The entire area would be managed under a modified fire suppression policy.
- Activities for the purpose of gathering information would be allowed by permit provided they are carried on in an environmentally sound manner.
- Hunting would be allowed subject to applicable State and Federal laws and regula-

tions, without management restrictions on vehicular access.

- Control of predators would be allowed without wilderness considerations to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock. Methods of control would be determined as appropriate.

ALL WILDERNESS ALTERNATIVE

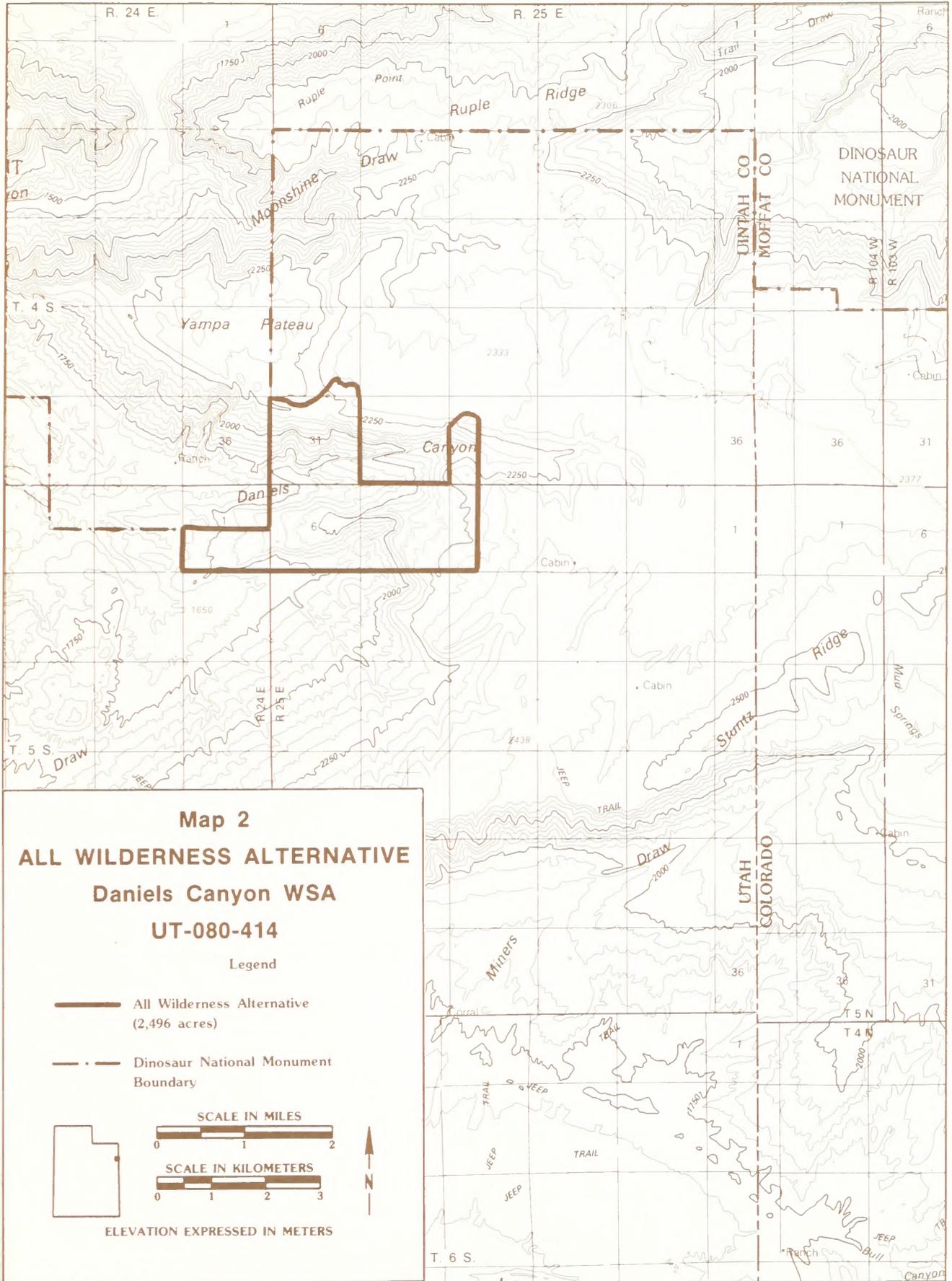
With this alternative, all 2,496 acres of the Daniels Canyon WSA would be designated by an act of Congress as part of the NWPS (refer to Map 2). This WSA is adjacent to Dinosaur National Monument and is contiguous with an 186,114-acre NPS-proposed wilderness. Because this WSA lacks the necessary size to constitute a wilderness area by itself, it can only be managed in part with the NPS-proposed wilderness. As a result, the Daniels Canyon WSA could be retained by BLM or transferred to the NPS, who would then assume management responsibilities. For the purposes of this analysis it is assumed that BLM would retain management of the Daniels Canyon WSA. It would be managed in part with the contiguous NPS-proposed wilderness in accordance with the BLM "Wilderness Management Policy" (USDI, BLM, 1981) to preserve its wilderness character.

Upon designation, acquisition of one section of State land is likely, and would be authorized by purchase or exchange (refer to Map 1). Should land transfers be made, it is assumed that management and types of impacts to former State in-holdings would be the same as those on adjacent Federal lands and no specific analysis is given here. The figures and acreages given under this alternative are for Federal lands only. No private or split estate lands are located in the WSA; however, private lands are in one location on the east adjacent to the WSA boundary. These private lands would not be acquired by BLM.

The following are specific actions that would be taken under this alternative:

- After wilderness designation, all 2,496 acres would be closed to new mineral leasing and mineral sale. Mining development, extraction, and patenting would be prohibited. Seven existing oil and gas leases involving 2,176 acres would be phased out

DANIELS CANYON WSA



DANIELS CANYON WSA

upon expiration unless a find of oil or gas resources in commercial quantities is shown.

- Present domestic livestock grazing would be allowed to continue as authorized in the Blue Mountain MFP. The 127 AUMs in the WSA would remain available to livestock as presently allotted. Existing range developments as noted in the No Action Alternative could be maintained based on practical necessity and reasonableness. After designation, new rangeland developments would be allowed on a case-by-case basis if necessary for resource protection (rangeland and/or wilderness) and the effective management of these resources, provided that resource protection standards are met (refer to Appendix 1). Additional livestock reservoirs, if proposed in the future, would not be allowed.
- New water resource facilities or watershed activities not related to rangeland or wildlife management would be allowed after designation only if they would enhance wilderness values, correct conditions presenting imminent hazard to life or property, or if authorized by the President pursuant to Section 4(d)(4)(1) of the *Wilderness Act* (Eighty-Eighth Congress of the U.S. 1964). No water resource facilities or treatments are presently planned.
- Wildlife transplants and developments would be allowed after designation if compatible with wilderness values. Although none are now proposed, new projects would be considered for approval on a case-by-case basis, as long as criteria are met to adequately protect wilderness values (refer to Appendix 1).
- The entire 2,496-acre area would be closed to off-road vehicle (ORV) use except for users with valid existing rights if approved by BLM in accordance with 43 CFR provisions. About 2 miles of existing vehicular ways would not be available for vehicular use except as indicated above. About 1 mile of the WSA boundary follows an existing dirt road that would remain open to vehicular travel.
- A specific Wilderness Management Plan would be developed to govern use and protection of the 2,496-acre wilderness. As part of that plan, it is assumed that a maintenance-and-use border would be allowed along roads that are adjacent to the wilderness area for purposes of road maintenance, temporary vehicle pull-off, and trailhead parking. This border would be up to 100 feet from the edge of the road travel surface.
- Harvest of forest products would not be allowed except for harvest of pine nuts or noncommercial gathering of dead-and-down wood, if accomplished by other than mechanical means. There is no harvest of forest products at the present time, nor is any specifically planned.
- Visual resources on 2,496 acres would be managed in accordance with VRM Class I standards, which generally allow for only natural ecological change.
- Measures to control fire, insects, noxious weeds, or disease within the area would be taken in instances that threaten human life, property, or high-value resources on adjacent nonwilderness lands, or where unacceptable change to the wilderness resource would result if the measures were not taken. Measures taken must be those having the least adverse impact to wilderness values (i.e., those that least alter the landscape or disturb the land surface). Therefore, it is assumed that firefighting would be limited to hand and aerial techniques.
- Any activity for the purpose of gathering information about natural resources in the 2,496-acre area would be allowed by permit provided it is carried on in a manner compatible with the preservation of the wilderness resources. Research and other studies would be conducted without use of motorized equipment or construction of temporary or permanent structures unless no other feasible alternatives exist.
- Hunting would be allowed subject to applicable State and Federal laws and regulations but without the use of motorized vehicles.
- Where control of predators is necessary to protect threatened or endangered wildlife species or on a case-by-case basis to prevent special and serious losses of domestic livestock, it would be accomplished by methods directed at eliminating the offending individuals while at the same time presenting the least possible hazard to other animals or to wilderness visitors. Poison baits or cyanide guns would not be used. A predator control program would be approved only upon clear showing that

removal of the offending predators would not diminish the wilderness values of the area.

Summary of Environmental Consequences

Table 1 summarizes the main environmental consequences resulting from implementation of the alternatives. Those resources that would be affected significantly or differently by the alternatives are noted in the table to provide a comparison of the alternatives.

AFFECTED ENVIRONMENT

Air Quality

The WSA is located in a Prevention of Significant Deterioration (PSD) Class II area under the provisions of the Clean Air Act as amended. This classification permits moderate air quality deterioration. The nearest Class I area in Utah is Arches National Park about 108 miles to the south. The Colorado portion of Dinosaur National Monument, 4 miles to the northeast, is classed as Colorado Category I which is about the equivalent of Federal PSD Class I.

Current air quality of the region is typical of a largely undeveloped region in the western United States. Measured long-term average concentrations of pollutants are well within current standards except for total suspended particulates. The probable cause of this exceedance is wind-blown dust from unpaved roads. Normal visual range in the vicinity varies from about 110 to 120 miles during the summer (USDI, BLM, 1983).

Geology

The Daniels Canyon WSA is on the northeastern edge of the Uinta Basin, in that region between the Rocky Mountains of Colorado and the Wasatch Range of central Utah. It is in the Colorado Plateau Physiographic Province. The Basin is bounded on the north by the Uinta Mountains and on the south by the Roan Cliffs and the Book Cliffs escarpment. Elevation ranges from 5,600 feet along Cub Creek to 7,720 feet on the eastern boundary of the area. The area is characterized along the northern part of the unit by Weber Sandstone and Park City Formations, with a small area of Brown's Park on the east boundary. The nearly white Weber Sandstone, which forms the near vertical canyon walls along Daniels Canyon,

slick rock ledges, and erosional sink holes, contrasts with the red rock exposures of the Moenkopi, making the area one of high visual contrast. The most spectacular landform is Daniels Canyon. It is a narrow cut through cream-colored sandstone with a steep wall rising 900 feet on the south side and 1,600 feet on the north.

Soils

Soils in the WSA are deep in the flatter canyon bottoms and shallow on slopes from 10 to 80 percent. Steeper slopes of over 40 percent have a critical erosion condition at present and high erosion hazard. Miscellaneous landforms such as rock outcrops and badlands make up 35 percent of the WSA. Table 2 summarizes soil erosion condition classes within the unit.

**TABLE 2
Erosion Condition**

Classification	Annual Soil Loss per Acre (cubic yard/acre)	Acres	Percent of WSA	Total Annual Soil Loss for WSA (cubic yard)
Severe	5.4	0	0	0
Critical	2.7	560	22	1,512
Moderate	1.9	900	37	1,710
Slight	0.9	160	6	144
Stable	0.3	0	0	0
Barren (rock outcrop and badlands)	0.0	876	35	0
Total		2,496	100	3,366

Sources: USDI, Bureau of Reclamation, 1975; USDI, BLM, 1974a; U.S. Department of Agriculture, Soil Conservation Service, 1978.

Vegetation

Vegetation changes with aspect. The upper northern slopes consist of heavy shrub cover of mountain mahogany, serviceberry, and big sagebrush. Scattered pinyon trees also grow here with densities of both juniper and pinyon increasing at lower elevations. Southern exposed slopes are dominated by pinyon-juniper stands with a low density understory of shrubs and blue-grasses. At the highest elevation and on the eastern and northern edges of the WSA are small stands of ponderosa pine totaling approximately 35 acres. The flat canyon bottoms consist of greasewood, big sagebrush, and various grasses. Surrounding the spring and along the stream in lower Daniels Canyon are patches of box elder trees. Table 3 summarizes the number of acres of each vegetation type.

**TABLE 1
SUMMARY OF SIGNIFICANT ENVIRONMENTAL CONSEQUENCES
DANIELS CANYON WSA**

Resource	Alternatives	
	No Action (Proposed Action)	All Wilderness (2,496 Acres)
Mineral and Energy Resources	Although likelihood of development is low, potential recovery could be achieved for up to 3 million barrels of oil and 18 billion cubic feet of natural gas. Low temperature geothermal energy might also be developed.	Oil, gas, and geothermal energy likely would not be recovered. Due to the low likelihood of recovery of these mineral resources, however, the loss of development opportunity would not be significant.
Wildlife	About 7 percent of the WSA could be affected by energy development, which could adversely affect wildlife habitat.	Wildlife would benefit from solitude.
Livestock	Grazing of 127 AUMs and maintenance of existing developments would continue. New developments could be constructed; however, none are now proposed.	Grazing of 127 AUMs and maintenance of existing developments would continue. Little effect on grazing management is expected. If proposed, new developments might not be allowed.
Visual Resources	The quality of visual resources could be impaired on up to 186 acres.	Visual quality would not be impaired.
Recreation	ORV use would continue on 2 miles of ways. Overall recreational use could increase from the present 150 visitor days per year to 225 over the next 20 years. Up to 186 acres of mineral-related disturbance could reduce the quality of primitive recreation.	The WSA, including 2 miles of ways, would be closed to ORV use. Primitive recreational use could increase by an undetermined amount due to publicity associated with wilderness designation.
Wilderness Values	Wilderness values could be lost on up to 186 acres (7.5 percent of the WSA).	Wilderness values would be protected throughout the WSA.
Land Use Plans and Controls	This alternative would not conflict with the <i>Uintah County Master Plan</i> or State of Utah plans and policies. It would be consistent with the current BLM Blue Mountain MFP. It would not complement the NPS proposal for nearby wilderness.	This alternative would not conflict with the <i>Uintah County Master Plan</i> . It would be consistent with State policy if adjacent lands were exchanged, and would complement the NPS proposal for wilderness. Designation would constitute an amendment of the BLM Blue Mountain MFP.
Socio-economics	Annual local sales of less than \$3,155 and Federal revenues of up to \$6,706 would continue. An additional \$970 per year in Federal revenues could be derived from leasing of presently unleased areas.	Annual local sales of less than \$3,155 and Federal revenues of up to \$178 would continue, but Federal revenues of up to \$7,488 from mineral leasing would be foregone. The opportunity for future energy and mineral development and local economic benefits would be reduced in the WSA.

TABLE 3
Existing Vegetation Types

Existing Vegetation Type	Acres	Percent of WSA
Shrubs, grasses, forbs	635	25
Rock outcrops, badlands	876	35
Pinyon-juniper and sagebrush	950	39
Conifer	35	1
Totals	2,496	100

Source: USDI, BLM, 1974a.

The WSA contains potential habitat for two plant species listed as sensitive. These plants are *Astragalus chloodes* (grass milkvetch) and *Astragalus saurinus* (Dinosaur milkvetch). These plants may be found in the lower western portions of the unit. They are, however, locally abundant in the Uinta Basin with numerous populations and no serious threats to the survival of the species exist.

The Daniels Canyon WSA is located in the Rocky Mountain Forest Province Ecoregion as shown on the Bailey-Kuchler ecosystems map (USDI, Geological Survey, 1978). The potential natural vegetation (PNV) type in the WSA is sagebrush steppe. PNV is the vegetation that would exist if plant succession were allowed to reach climax without human interference. It does not necessarily reflect the actual vegetation present. PNV is an important object of research because it reveals the biological potential of a site.

Water Resources

Water resources of the Daniels Canyon WSA include Cub Creek, two springs, and several seeps. The two reservoirs in the WSA hold water most of the year. Their capacity is less than one acre-foot. No information is available on the quality or quantity of water in the springs.

One of the two springs is located in the bottom of Daniels Canyon. The spring is perennial and is a principle contributor to Cub Creek. The second spring produces only sufficient water to maintain a stockwatering trough and is located near the head of the Daniels Canyon.

The amount of water stored in reservoirs and flowing from seeps and springs is adequate at the present time for livestock and wildlife needs. No additional water developments are planned by BLM at present, nor have additional needs been identified.

Estimated flow of Cub Creek originating in Daniels Canyon is less than 1 cubic foot per second (cfs). Water is used by livestock (cattle and sheep) and wildlife.

BLM has several claims to water for stockwatering within the unit. Table 4 shows the water claim numbers and location for all BLM claims.

A local rancher in this area claims that all waters of Cub Creek drainage have been decreed to his ranch by a court decision dated April 6, 1916, Fourth Judicial District Court, and he indicates possible long-term plans for development and use. A recent check of the water user file at the Uintah County Court House indicated no private or individual filing for the Daniels Canyon WSA.

TABLE 4
BLM Water Claims

Water User Claim No.	Source	Location	Use
49-779	Lower Doc's Valley Reservoir	Sec. 31, T4S, R25E	Stockwatering
49-780	Upper Doc's Valley Reservoir	Sec. 31, T4S, R25E	Stockwatering
49-949	Cub Creek	Sec. 33, T4S, R25E	Stockwatering
49-950	Trib. to Cub Creek	Sec. 33, T4S, R25E	Stockwatering
49-951	Cub Creek	Sec. 31, T4S, R25E	Stockwatering
49-952	Trib. to Cub Creek	Sec. 31, T4S, R25E	Stockwatering
49-953	Trib. to Cub Creek	Sec. 5, T5S, R25E	Stockwatering

Source: USDI, BLM, 1985.

Mineral and Energy Resources

The Daniels Canyon WSA has no past history of mineral significance and the occurrence of minerals is speculative.

The BLM, in cooperation with the U.S. Department of Energy had each WSA in Utah assessed for its energy and mineral resources by Science Applications, Inc. (SAI, 1982). Refer to Appendix 5 for a detailed description of the SAI rating system. The energy and mineral rating summary for the Daniels Canyon WSA is given in Table 5.

The Daniels Canyon WSA has been assigned a very low importance rating for mineral resources. An overall importance rating (OIR) of 1 (on a 1 to 4 scale, where 4 is equated with high mineral importance) is given for the WSA. The OIR

attempts to integrate the individual mineral resource evaluations for a tract with other data, such as size and proximity, to other influence factors into a summary number that reflects an overall assessment of the resource importance of the WSA.

If the WSA is recommended as wilderness, its mineral importance will be reviewed by the USDI, Geological Survey and Bureau of Mines in an independent mineral investigation report for the WSA. Reports will be made available to the public and will be submitted to the President and Congress as required by the FLPMA. BLM and the Secretary of the Interior will also consider the available reports prior to making final wilderness recommendations.

The Strategic and Critical Materials Stock Piling Act, as amended, provides that strategic and critical materials be identified and stockpiled in the interest of national defense to prevent a costly and dangerous dependence on foreign sources in time of a national emergency. The Act defines strategic and critical materials as those needed to supply military, industrial, and essential civilian needs during a national emergency but that are not found or produced in the United States in sufficient quantities to meet such a need. Although highly speculative, vanadium is the only critical mineral that could be found in the WSA (Federal Emergency Management Agency, 1983).

TABLE 5
Mineral and Energy Resource Rating Summary

Resource	Rating		Estimated Resource
	Favorability ¹	Certainty ²	
Oil and Gas	f2	c1	Less than 10 million barrels of oil; less than 60 billion cubic feet of gas
Tar Sand	f1	c3	None
Coal	f1	c4	None
Uranium/ Vanadium	f2	c1	Less than 500 tons
Geothermal	f2	c2	Low temperature
Hydropower	f1	c4	None
Copper	f1	c3	None
Phosphate	f1	c4	None

Source: SAI, 1982.

¹Favorability of the WSA's geologic environment for a resource (f1 = lowest, f4 = highest).

²Degree of certainty that the resource exists within the WSA (c1 = lowest, c4 = highest).

LEASABLE MINERALS

Oil and Gas

Nearly all of the Uinta Basin can be considered

prospectively valuable for energy-related minerals. The Uinta Basin is a major structural depression. At the northern and deepest end of the Basin, sedimentary strata younger than pre-Cambrian age total about 32,000 feet, although 80 percent of this thickness is accounted for by Upper Cretaceous and Tertiary rocks (Ritzma, 1972). Rocks younger than Jurassic age are not preserved in the Daniels Canyon WSA.

The principal oil and gas fields in the Uinta Basin produce from Tertiary rocks. The oldest productive unit is the Weber Sandstone of Permian-Pennsylvanian Age in the Ashley Valley Field about 10 miles southwest of the WSA. Because Jurassic and younger rocks are not preserved in the WSA (except for remnants of the Browns Park Formation of Tertiary age), little correlation exists between the WSA and oil and gas production in the rest of the basin. The Daniels Canyon WSA is between two large anticlines—Split Mountain, 4 miles to the north, and the Section Ridge/Blue Mountain anticline, 4 miles to the south. The structural favorability of the WSA for oil and gas accumulations is, therefore, low. Furthermore, deep erosion by the Green River at Split Mountain and Whirlpool Canyon, a few miles to the north, has exposed the entire Paleozoic section. If oil and/or gas accumulations exist in the WSA, they are most likely to occur as small accumulations in stratigraphic traps (SAI, 1982). At best, the Daniels Canyon WSA is considered favorable for a shallow gas field with ultimate recoverable reserves of less than 3 million barrels of oil or less than 18 billion cubic feet of gas. The certainty that oil and gas resources exist in the WSA is low because few wells have been drilled in the vicinity. Currently, 2,176 acres, representing 87 percent of the unit, are leased for oil and gas.

Oil and gas leases issued prior to the passage of FLPMA in October 1976 are referred to as pre-FLPMA leases and are managed differently than those issued after that date. The latter are known as post-FLPMA leases.

Pre-FLPMA leases are governed by stipulations determined at the time of lease application, before wilderness studies were mandated. These stipulations may allow for the impairment of wilderness values, as a prior and existing right associated with lease development.

Post-FLPMA leases in WSAs contain more restrictive stipulations which require exploration and development to be nonimpairing to wilderness values. Post-FLPMA leases generally require restricted access and special reclamation provisions, such as topographic contouring, special seeding, and hydromulching (USDI, BLM, 1981).

Because of less restrictive requirements, pre-FLPMA leases may be more economical to explore and develop than post-FLPMA leases. All of the leases in the Daniels Canyon WSA are post-FLPMA leases.

Undeveloped leases would terminate on their expiration dates (usually 10 years from the date of issuance). Wilderness designation would not affect the termination of existing leases. Table 6 lists the leasing status for the Daniels Canyon WSA.

The entire WSA is covered by BLM's oil and gas category system. Category 1 contains 1,869 acres; Category 2, 160 acres; and Category 3, 467 acres.

TABLE 6
Oil and Gas Leases

Leases	Acres	Percent of WSA
Pre-FLPMA Leases	0	0
Post-FLPMA Leases	2,176	87
Unleased-Open to Future Leasing	320	13
Total	2,496	100

Source: USDI, BLM, 1974a.

Oil Shale and Tar Sand

Oil shale is related to the sediments (comprising the Green River Formation) which were deposited in ancient Lake Uinta, a body of water that covered about 20,000 square miles in the present-day area of the Uintah and Piceance Creek Basins. Oil shale is not known to exist in the vicinity of the WSA.

Several of the 50 plus tar sand deposits identified throughout the State of Utah are located within the Uinta Basin. The in-place oil is found primarily in the sandstones and siltstones of the Green River Formation of Tertiary Age (particularly in the Douglas Creek and Parachute Creek Members). A minor oil-impregnated rock deposit occurs about 6 miles northwest of the WSA. The oil there occurs in limestone of the Park City Formation of Permian Age. Permian rocks underlying Daniels Canyon may also contain some heavy oils but such deposits, if they indeed exist, are not considered to be a usable resource. On this basis, the WSA has no potential for tar sand. The certainty that this resource does not exist at depth in the WSA is relatively high.

Coal

Bedrock at the surface of the WSA consists of sedimentary rocks of Triassic Age, underlain by

Paleozoic rocks. Because these rocks are not known to be favorable for coal resources anywhere in the region, there is a high certainty that coal resources do not exist in this WSA.

Phosphate

Although phosphate-bearing rocks occur west of the Split Mountain anticline, there is no evidence that phosphate beds occur in the vicinity of the WSA.

Geothermal

The overall geothermal potential of eastern Utah is considered to be low. Thermal waters less than 60 degrees Centigrade (C) have been reported from many oil and gas fields in the Uinta Basin. At the Ashley Field, 10 miles southeast of the WSA, thermal waters up to 56 degrees C have been produced at depths of about 4,200 feet. Near Split Mountain, about 5 miles northwest of the WSA, a warm spring discharges 30 degree C water into the Green River (National Oceanic Atmospheric Administration, 1979).

Low-temperature thermal waters (less than 90 degrees C) could underlie the Daniels Canyon WSA at relatively shallow depths (less than 1,000 feet). Because of the low temperatures, the WSA has a low geothermal favorability. The certainty that geothermal resources exist is relatively low, but based on nearby thermal springs and wells there is a possibility of occurrence.

LOCATABLE MINERALS

Locatable mineral activity is governed by the Mining Law of 1872. Under this law, the mining claimant has the right to locate, develop, and produce mineral resources on open public land. The Daniels Canyon WSA has no existing mining claims. It has no demonstrated value for locatable minerals, no history of economic production of locatable minerals, and is not considered potentially valuable for development.

Uranium and Vanadium

The existing geologic environment may contain uranium-vanadium or copper deposits but this is highly speculative.

Remnants of the Chinle Formation are preserved in the WSA and it seems reasonable to speculate that small accumulations of uranium and/or vanadium may be contained in these rocks. Uranium is reported to occur about 2 miles southwest of the tract, within the Gartra Grit Member of the Chinle Formation. The ore is sub-economic and occurs in areas of carbonaceous trash. Older rocks within the tract apparently have very little uranium potential (SAI, 1982).

Copper

The most important copper mine in the vicinity of the Daniels Canyon WSA is the Dyer Mine located in the Uinta Mountains about 30 miles to the northwest. Copper was produced intermittently up until 1941 and probably less than 1,000 tons of copper ore were ever shipped from the Dyer Mine. In 1896, copper was discovered in the Manning Canyon Shale (Mississippian age) near the mouth of the Sage Creek where it empties into Whirlpool Canyon on the Green River. The prospect/mine is about 8 miles northeast of the WSA. It is reported that about 5 tons of ore containing about 55 percent copper and about 69 ounces of silver per ton were recovered at this locality in 1899.

Small pockets of copper-bearing rocks could be contained in Triassic and older sedimentary rocks in the WSA but such deposits would be more of a curiosity than a copper resource.

SALABLE MINERALS

There is currently a building stone quarry outside and 0.50 mile south of the southeast corner of the WSA. This is an unusual deposit where large blocks of sandstone have been exfoliated on the surface making them easily accessible. There is no similar occurrence within the WSA.

Wildlife

Wildlife present in the WSA include mule deer, mountain lion, coyote, cottontail, and jack rabbit, in addition to many small mammals and rodents such as deer mice and kangaroo rats. Limited numbers of sage grouse are sometimes found along the eastern boundary. A variety of non-game birds can be observed at various times of the year, ranging from golden eagle to scrub jay and downy woodpecker.

No threatened or endangered species are year-round residents of the WSA. Occasionally, peregrine falcon and bald eagle (both endangered species) may pass through the area during spring and fall migration. A small reintroduced population of peregrine falcon is known to exist near the Yampa River in Dinosaur National Monument. These birds occupy an area approximately 5 to 6 miles distant and are not known to have frequented this WSA.

The lower elevations of the unit provide habitat for wintering mule deer; numbers depends on the severity of the weather. The area is popular for deer hunting, especially the eastern portion of the unit. The area is not classified as critical habitat by the Utah Division of Wildlife Resources (UDWR).

Vegetation manipulation to improve wildlife habitats is not practical in the WSA due to the overall steepness of the terrain.

Forest Resources

Historically, the area has never been important for firewood gathering or pine nut harvesting. A few small stands of ponderosa pine, about 35 acres, grow on the area. Because of low site productivity and the difficulty to obtain reproduction, these stands are classified as nonproductive. The highest potential is for watershed protection and wildlife habitat.

The pinyon-juniper stands have very low commercial value because they grow in a remote area not accessible by motor vehicle, and volumes per acre are less than 7 cords. There is no harvest in the WSA at the present time.

Livestock and Wild Horses/Burros

The Daniels Canyon WSA includes parts of three grazing allotments used by four permittees. There are 127 AUMs of forage produced annually within the WSA. Table 7 lists livestock grazing use data for the WSA.

TABLE 7
Livestock Grazing Use Data

	Cub Creek	Doc's Valley	Green River
AUMs in Allotment	55	1,219	1,408
AUMs in WSA	55	61	75
Percent in WSA	100	5	5
Number of Operators	1	2	3
Class of Livestock	Cattle	Cattle/Sheep/Horses	Sheep
Season of Use	6/1-9/30	5/1-10/31	11/1-2/28 4/1-4/30

Source: USDI, BLM, 1974a.

Present livestock management facilities include one brush fence, one spring development, and two reservoirs. Livestock are trailed through this unit from Cub Creek (Josie Morris Ranch) to the top of Blue Mountain.

Because of the rugged terrain and sparse quantities of desirable forage, use by livestock is low in comparison with adjacent areas. The entire area consists of steep slopes, shallow soils, and terrain best suited for wildlife. This rough topography precludes any type of range treatment and at the same time has created natural livestock fences and barriers. No agricultural lands exist.

DANIELS CANYON WSA

There are no populations of wild horses or burros that range through this area.

Visual Resources

Daniels Canyon consists of steeply sloping exposed rock outcrops. It is a boulder-filled canyon that intermittently runs water. The skyline is smooth to irregular. Line is expressed in the various rock formations, skyline, and intersecting planes of ridges. Soil colors vary from red-brown to sharply contrasting cream. Scattered pinyon-juniper is grey-green.

Visible man-made features inside the unit consist of a nondominant-appearing livestock trail passing through the center of the unit and a brush fence 0.25 mile long created by grubbing out juniper and piling by a crawler tractor.

The area is scenic and affords some excellent panoramic views to the west. External sights and sounds visible from certain viewpoints, but not strongly intrusive, include glint from a metal building 6 miles to the west, townsites of Vernal and Jensen, at night the beacon at the Vernal Airport, distant vehicular traffic lights, and a dirt road on the north side of Blue Mountain. Positive external sights from certain viewpoints include spectacular views of the Green River, Pelican Lake, and the Uinta Mountains to the west. The townsites are at a distance far enough that no single building or road is visible.

BLM visual resource evaluations assessed scenic quality as Class A on all 2,496 acres. Public concern for scenic quality preservation (expressed as sensitivity) is high; however, most of the area is seldom seen.

The resulting VRM class for the area (2,496 acres) is Class II. (Refer to Appendix 7 for an explanation of BLM's VRM rating system.)

The modifications that have occurred in the unit are not highly visible. A fence created by bulldozing a linear pattern of juniper is out of context and creates contrast that is noticeable during the winter. The livestock trail is noticeable but not dominant and meets VRM Class II requirements.

Cultural Resources

There are 82 recorded archaeological sites in the vicinity of the WSA. Most of these archaeological sites are concentrated outside the WSA, downstream along Cub Creek. These sites encompass a wide range of habitation and cultural utilization. The majority of the recorded sites belong to the Fremont Culture of 500 to 1250 A.D.

Daniels Canyon contains an abundance of rock shelters of which many had cliff dwellings and storage pit ruins. Dwellings show minimal vandalism.

No National Register sites exist; however, because of the concentrations of sites in and adjacent to the unit, there is a potential for future nominations.

Of historic interest is the Josie Morris Ranch within Dinosaur National Monument. Three to four thousand Monument visitors tour the ranch annually. This ranch where the road ends is a natural trail head to Daniels Canyon.

Recreation

Recreational activities available in the WSA include dayhiking, geologic sightseeing, and photography. Dayhiking opportunities are good because the area is very accessible and a trail already exists. The trail leads from the Josie Morris Ranch to the head of Daniels Canyon. Along the trail vistas of the Uinta Basin, the minarets of Split Mountain Gorge, the meandering Green River, the exposed red rock ledges of the Moenkopi Formation, and the white steeply sloping rock of the Weber Sandstone make the area one of high visual contrast.

Erosional forces have exposed several geologic formations and are evident even to the casual observer. The geologic features, contrasts in vegetation, and panoramic views provide subjects for the photographer.

The existing trails lend themselves to the horse rider. Extended rides to the mesa top of Blue Mountain and to observation points, with Dinosaur National Monument looking into the Split Mountain Gorge, afford recreational opportunities. However, steep rugged terrain makes it difficult for foot travel beyond this point. Deer and limited sage grouse hunting is popular in the fall, especially at the higher elevations of the WSA.

Daniels Canyon provides a highly rugged and scenic dayhike. Visitors park at the Josie Morris Cabin and hike up Daniels Canyon or park on Blue Mountain, at the northeast boundary, and hike down. Forms and patterns are varied, with water chutes, slick rock ledges, smooth-sided pot-holes, and huge boulders jumbled together. A small stream flows from a spring in the lower portion of the canyon.

Visitor use within the unit is estimated at 150 visitor days of which 50 days of use is contributed by hunting. There is no commercial recreational use in the WSA.

DANIELS CANYON WSA

The entire WSA is open to ORV use, but the rough terrain limits this use to existing jeep trails.

Wilderness Values

SIZE

The WSA contains 2,496 acres of public land, and is about 3 miles wide (east to west) and 2 miles long (north to south).

Because of the small size of this WSA (less than 5,000 acres) it does not qualify for wilderness status. However, the area qualifies for wilderness consideration under Section 202 of FLPMA because it is contiguous with a 186,114-acre proposed wilderness area within Dinosaur National Monument. Of the 2 miles of common boundary, 0.50 mile is contiguous to an area that has been formally recommended as wilderness. The initial NPS wilderness recommendation was submitted to Congress in August 1974. The recommendation for the unit was revised and resubmitted in February 1978. To date, no Congressional action has been taken on the NPS recommendations.

NATURALNESS

The WSA has only a few human imprints and none of these, when considered individually or collectively, greatly affect naturalness. There is an actively used stock drive trail along the side of Daniels Canyon. This trail resembles a hiking trail and does not affect outstanding naturalness. In Daniels Canyon, there is no imprint of man's work and it has retained its primeval character. Near the top of Blue Mountain, a 0.25-mile brush fence exists. Because it is made of local materials and well screened, it is not considered intrusive.

The biggest imprint on the surface is a small maze of jeep trails, about 2 miles, that wind along the top of a ridge near the southwest boundary. These trails are screened by the topography and juniper vegetation so that they are not noticeable from other portions of the unit. These were built for uranium exploration in the 1950s, receive little, if any, use now and have eroded to four-wheel drive ways.

There are two livestock reservoirs in the WSA. They are small and unobtrusive. A spring developed many years ago located near the east boundary of the unit provides water to livestock. A trail leads to the spring. Development consists of a single trough that is secluded by vegetation. A short gap-fence, approximately 200 yards long, was built by NPS to mark the boundary of the Monument along the west edge of the unit.

Overall, the imprint of man's work is substantially

unnoticeable and the WSA meets the criteria for naturalness.

SOLITUDE

The Daniels Canyon WSA provides an opportunity for solitude because of the topography and vegetation screening, especially in the northern half.

The terrain to the south is broken by a canyon and partially razor-backed ridge and offers some screening along with the scattered pinyon-juniper. Daniels Canyon is rugged with screening provided by large boulders, tangled box elder branches, ledges, and water chutes.

From the upper elevations there are panoramic views of Jensen and Vernal. However, because of the distance, no individual feature such as roads or prominent buildings are visible during the day. At night, only the lights of these towns and the airport beacon are visible. U.S. Highway 40, east of Jensen, is not visible nor are the highway noises audible under ordinary conditions.

An off-site item that detracts from the feeling of isolation is the visibility of the Blue Mountain road to the south of the WSA. The road is unpaved, frequently traveled during the summer (especially during the grouse and deer hunting season), and visible from locations within the unit.

Solitude is judged to meet the criteria for outstanding opportunities on all 2,496 acres.

PRIMITIVE AND UNCONFINED RECREATION

Hiking and horseback riding are the best forms of primitive and unconfined recreation opportunities present. Hiking or riding the livestock trail through the WSA can be done in one day. Panoramic views, photographic opportunities, and the chance to view wildlife or wild flowers in bloom add to the experience.

However, the hiking opportunities are only moderately expanded from those available in the adjacent proposed wilderness within Dinosaur National Monument. Riding or hiking, the recreationist can continue on 2 miles to the Yampa Plateau to an outstanding overlook of Split Mountain Gorge. Continuing beyond this point to other locations within the NPS-proposed wilderness is very difficult because of steep canyon terrain and confining wilderness boundaries that follow the canyon rim along the Green River.

State land must be crossed when hiking either in Daniels Canyon, on the livestock trail, or crossing into the NPS-proposed wilderness, although it is assumed that this land would be exchanged should the WSA be designated as wilderness.

To some users, the confining nature of the landscape makes the area best suited for day use and, therefore, does not provide a wilderness experience. The recreation experience is not considered outstanding because of the confining limits due to terrain.

SPECIAL FEATURES

Special features include outstanding views of the surrounding countryside from within the WSA. Also, because a number of archaeological sites exist, opportunities for interpretation of the sites exist.

Land Use Plans and Controls

The *Uintah County Master Plan* does not specifically address the Daniels Canyon WSA. However, the county planning staff stated that designation of Daniels Canyon WSA as wilderness would not conflict with present land use or policy (Nicholson, 1982).

There are no private surface or subsurface mineral rights within the unit, and there are no existing rights-of-way in the WSA.

The BLM land use plan for this area (Blue Mountain MFP) indicates multiple-use management with restrictions on oil and gas drilling on 627 acres adjacent to Dinosaur National Monument and careful evaluation of any proposed developments.

State Section 32 is bordered on three sides by the WSA. Access is limited to only the very northern portion. The remainder of the section is blocked by either terrain obstacles or BLM land. The State has made no improvements nor are any planned on this section in the future.

Two commonly used points of access to the unit are from the Josie Morris Ranch in Dinosaur National Monument or from the top of Blue Mountain. From the Josie Morris side, a combined distance of 0.75 mile of State and NPS land must be crossed. No access problems are apparent for the Federal land. From Blue Mountain on the east side, approximately 0.50 mile of private land must be crossed. Roads cross the private land but no public easements have been secured. Public access across private land may cause problems in the future.

The Daniels Canyon WSA is contiguous with 186,114 acres in Dinosaur National Monument that are recommended for wilderness by the NPS. In 1984, the House Subcommittee on Public Lands and National Parks conducted a hearing on H. R. 1214, a bill designed to transfer jurisdiction

of certain lands, including the Daniels Canyon WSA, from the BLM to the NPS.

In response to the hearing, the NPS assessed the WSA to determine its value for potential addition to the adjacent NPS unit and found that with additional acreage the Daniels Canyon WSA would supplement the values of the monument (USDI, NPS, 1984a and 1984b). In a February 6, 1985, letter from the Secretary of the Interior to the Honorable John Seiberling, Chairman, Subcommittee on Public Lands and National Parks, Committee on Interior and Insular Affairs, the Daniels Canyon WSA and other adjacent land (totalling 5,818 acres) were recommended as suitable for inclusion into the adjacent unit of the National Park System (U.S. Secretary of the Interior, 1985). No Congressional action has been taken on the NPS recommendation.

Socioeconomics

DEMOGRAPHICS

Daniels Canyon WSA is located in northern Uintah County, Utah. Nearest communities are Jensen (population 500), and Vernal (population 7,500) in Utah, and Dinosaur (population 501) and Rangely (population 3,193) in Colorado.

Uintah County can be characterized as rural and sparsely populated. The 1983 county population was 24,600, less than 2 percent of the Utah State population of about 1.5 million (Utah Office of Planning and Budget, 1984). The majority of the county is unpopulated, with 66 percent of the settlement concentrated in the Ashley Valley area. About 27 percent of the county's population lives in Vernal (U.S. Department of Commerce [USDC], Bureau of the Census, 1981). Vernal is basically a tourism, energy, and farming community. Population growth in Uintah County has increased about 5 to 8 percent per year in the past 5 years, primarily as a result of energy development.

The Uintah and Ouray Indian Reservation is located about 42 miles to the west of the WSA. The Ute Indian Tribe currently has 1,890 enrolled tribal members. The tribe's population has increased significantly through the last decade, from 1,292 members in 1972 to 1,890 members in 1981, a 46-percent increase. In 1980, 85 percent of the enrolled tribal members lived on or near the Reservation. An additional 420 Indians live on or near the Uintah and Ouray Indian Reservation but are not enrolled Ute tribal members. However, they may be members of other Federally recognized Indian tribes. The Uintah and Ouray Indian

Reservation has experienced out-migration rather than in-migration, due to the lack of attracting economic opportunities.

EMPLOYMENT

Recent statistics (refer to Table 8) for Uintah County show that more than 98 percent of local wage and salary employment is nonfarm, with about 14 percent employed in Federal, State, and local governments (USDC, Bureau of Economic Analysis, 1983). Mining and tourism are the most important private industries in Uintah County. Mining directly accounts for about 21 percent of local employment. Tourism directly accounts for portions of the transportation, retail trade, and services sectors which comprise 48 percent of local employment. The mining and tourist industries purchase some of their supplies locally, and those who work in these industries spend part of their income locally. This circulation of money from export industries contributes to local income and employment.

TABLE 8
1982 Income and Employment
Uintah County, Utah

Industrial Sector	Income (\$1,000)	Employment (Jobs)
Agriculture	3,888	136
Total Agriculture	3,888	136
Nonagricultural		
Private Industry		
Ag. Services, Forest, Fish	227	24
Mining	61,842	2,042
Construction	19,025	840
Manufacturing	3,127	177
Transportation and Public Utilities	15,787	657
Wholesale Trade	9,654	406
Retail Trade	14,695	1,334
Finance, Insurance and Real Estate	2,754	185
Services	49,568	2,691
Other	-	-
Total Private Industry	176,679	8,356
Government		
Federal Government	5,710	373
State and Local Government	11,947	914
Total Government	17,657	1,287
Total Nonagricultural	194,336	9,643
Total Agriculture and Nonagriculture	198,224	9,779

Sources: USDC, Bureau of Economic Analysis, 1983; Utah Department of Employment Security, 1983.

Note: Because of rounding, numbers are not additive. Total and income percentage figures include wage, salary, and proprietors' income. Total employment figures include wage, salary and proprietors' employment, whereas the employment percentage figures include only wage and salary employment.

A total of 432 enrolled Ute tribal members are employed. Some 52 percent (462) of the potential Indian labor force (894) is unemployed. This is mainly due to the lack of economic opportunities on the Reservation. A large share of the unemployed Utes have become discouraged and are no longer actively seeking work. Virtually all of the 432 employed tribal members work for either the tribe, Bureau of Indian Affairs, or a tribal enterprise (USDI, BLM, 1983).

INCOME AND REVENUES

Income in Uintah County is shown on Table 8. Past activities in the WSA that are of any local economic consequence include livestock production and recreation. Table 9 summarizes current local income and Federal revenues from the WSA. Appendix 9 identifies the multipliers used to estimate income and revenues.

TABLE 9
Local Sales And Federal Revenues

Source	Estimated Annual Income (Sales) ¹	Estimated Annual Federal Revenues
Oil and Gas Leases	None	\$6,528
Mining Claim Assessment	None	None
Livestock Grazing	\$2,540	\$178
Woodland Products	None	None
Recreational Use	Less than \$615	None
Total	Less than \$3,155	Up to \$6,706

Sources: BLM File Data; Appendix 9.

¹Local sales represent money potentially spent. They do not account for the total multiplier effect on local income that would be generated by these expenditures.

At a lease fee of up to \$3 per acre, the 2,176 leased acres in the WSA result in up to \$6,528 in Federal oil and gas lease revenues. One-half of these monies are returned to the State of Utah which then reallocates them to various funds, the majority of which are related to energy development and mitigation of local impacts of energy and mineral development.

Four livestock operators have a total grazing privilege of 127 AUMs within the WSA. If all this forage were utilized, it would account for \$2,540 of livestock sales, including \$635 of ranchers' returns to labor and investment. Average actual livestock use and, therefore, revenues generated from grazing in the WSA are unknown; however, the permittees in the WSA can use up to 127 AUMs per year. Based on a \$1.40 per AUM grazing fee, the WSA can potentially generate \$178 of grazing fee revenues annually, 50 percent of which would be allocated back to the local BLM district for the construction of rangeland improvements.

No significant woodland product harvest occurs in the WSA; therefore, there is no income to the local economy related to this resource.

The WSA's nonmotorized recreational use is minimal, primarily consisting of hiking and horseback riding. The WSA's motorized recreational use is associated primarily with hunting. Related local expenditures are well distributed and are insignificant to both the local economy and individual businesses. The actual amount of income generated locally from recreational use in the WSA is unknown. However, an approximate range of expenditures can be deduced (Dalton, 1982). This study indicates that statewide average expenditures per recreational visitor day for all types of recreation in Utah are approximately \$4.10. The recreational use for Daniels Canyon WSA is estimated as about 150 visitor days/year. Only a portion of the \$615 expenditures for recreational use of the WSA contributes to the local economy.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

Analysis Assumptions and Guidelines for All Alternatives

1. The alternatives would be carried out as cited in the Description of the Alternatives section of this document.
2. Future users in the WSA would meet requirements for all applicable Federal, State, and local permits.
3. Designation of an area as wilderness would not result in impacts due to direct disturbance of resources. Any direct disturbance of resources under wilderness designation would result from use of prior rights that must be recognized by BLM. Such disturbance could occur with or without wilderness designation and is assumed to occur at one time.
4. The impacts of wilderness designation would result from (1) protection of certain resources; (2) denial of the opportunity to develop certain resources; or (3) restrictions placed on or changes in allowable management practices and land uses.
5. Estimates of in-place mineral resources are given based on a mineral resource evaluation of BLM WSAs by SAI (1982). These esti-

mates were based on literature studies and known mining (including gas production) activities in the vicinity of the WSA. The analysis presented in this section identifies the estimated amount of potentially recoverable mineral resources and then, using BLM's field experience and judgment, qualifies the probability of future development based on terrain, transportation and economic factors. Appendix 6 records the methodology for estimation of potentially recoverable mineral resources.

6. Once designated, management of an area as wilderness would continue in perpetuity.

No Action Alternative (Proposed Action)

This alternative represents the current management situation. It assumes continued management of the area by BLM. The major changes that could occur in the area would be related to continued oil and gas leasing, mining, livestock management, and recreation use. The area would be open to leasable mineral resource use and development without restrictions for wilderness protection. The degree of future development is unknown but probably would be low because of the low mineral potential and the BLM management restrictions on part of the area (i.e., 467 acres in leasing Category 3). The following is a worst-case analysis based on the assumption that leasable minerals would be developed sometime in the future and cause the following disturbance: oil and gas, 160 acres; uranium-vanadium, 20 acres; and geothermal, 6 acres. These figures total 186 acres. (Appendix 10 lists mineral-related surface disturbance assumptions and estimates.)

AIR QUALITY

The WSA would continue to be managed as a Class II area under the PSD regulations. Disturbance of 186 acres would result in slight temporary increases in fugitive dust emissions. Reduction in visual range is not expected to be significant due to actions within the WSA; however, these actions would contribute to potential visibility impairment by all future energy developments in the Uinta Basin (USDI, BLM, 1983). Actions in the WSA could contribute to future air pollution that may violate the nearby Colorado Category I standards for the east part of Dinosaur National Monument.

GEOLOGY

No impacts to geology are expected because surface disturbances associated with oil and gas, uranium-vanadium, and geothermal exploration

and development activities would be localized and limited to 186 acres.

SOILS

It is estimated that up to 186 acres of soil could be disturbed by mineral exploration and development. Assuming that all disturbance would occur in areas with critical erosion class (worst-case analysis) and that erosion condition would increase one class, soil loss on the 186 acres would increase from 502 cubic yards/year to 1,004 cubic yards/year. Soil loss would decrease as reclamation occurred. The time required for complete reclamation cannot be determined but has been estimated as a minimum of 3 to 5 years for each disturbed site in the WSA. With this alternative, maximum annual soil loss in the WSA would increase by approximately 502 cubic yards (15 percent) over current annual soil loss.

VEGETATION

The anticipated maximum of 186 acres disturbed by energy and mineral development could have a local effect on the vegetation resource within the WSA. Because of the small areas disturbed and the varied existing vegetation composition, impacts to vegetation would not be significant.

No impacts to threatened and endangered plant species are expected since none are known to exist in the area, although impacts to potential habitat for two sensitive species could result. However, before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and informally consult with the Fish and Wildlife Service (FWS) as required by BLM policy (refer to Appendix 4). If any threatened or endangered species could be affected, BLM would initiate formal Section 7 consultation with the FWS under provisions of the Endangered Species Act. Appropriate mitigating measures would be applied. Because necessary measures would be taken, it can reasonably be concluded that the viability of populations of threatened, endangered, or sensitive species would be preserved with the No Action Alternative.

WATER RESOURCES

Impacts to water would interrelate closely to soils. Where surface disturbance would occur, increased sediment yield could affect water quality in Cub Creek. Surface disturbance from mineral and energy exploration and development could impact 186 acres under this alternative, with a soil loss increase of approximately 502 cubic yards per year. This would create a negative impact to the watershed, especially if surface disturbance

were to occur in the form of roads and drill pads in areas where soil has a critical erosion condition. The impact to water resources would decrease with reclamation.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

This alternative would have little impact on energy and mineral development. The entire area would remain open to leasable mineral exploration and extraction.

Oil and Gas

The WSA is considered to have scattered gas pools, anticipated to contain less than 3 million barrels of oil or 18 billion cubic feet of natural gas considered potentially recoverable. The oil and gas resource could be explored and developed without concern for wilderness values.

Geothermal

Although geothermal leases could be issued, no geothermal leasing, development, or related environmental impacts are expected due to the low temperature potential. If developed, only 6 acres would be disturbed.

Locatable Minerals

Locatable mineral development could occur within the Daniels Canyon WSA, although no mining claims now exist. Future claims could be located and the potential small deposits of uranium-vanadium oxide could be explored and perhaps developed under this alternative. The likelihood for this to occur in the foreseeable future is low because of low resource potential, economic factors, and low market conditions.

WILDLIFE

The WSA provides habitat for numerous species, including deer. These species would be slightly impacted in the short term by 186 acres of surface disturbance from energy and mineral activities. Oil and gas leasing categories would provide special stipulations to protect deer winter range. There would also be a short-term loss (3 to 5 years) of habitat on as much as 186 acres as actual mining and rehabilitation were carried out. Species sensitive to disturbance could move out if important habitat were disturbed but would likely return after activities ceased. Before authorizing surface-disturbing activities, BLM would conduct site-specific clearances of the potentially disturbed areas and informally consult with the FWS as required by BLM policy (refer to Appendix 4). If any threatened or endangered species could be affected, BLM would initiate formal Section 7

DANIELS CANYON WSA

consultation with the FWS under provisions of the Endangered Species Act. Appropriate mitigating measures would be applied. Because necessary measures would be taken it can reasonably be concluded that the viability of populations of the endangered peregrine falcon and bald eagle that may pass through the WSA would be preserved with the No Action Alternative.

FOREST RESOURCES

In the Daniels Canyon WSA, there would be no significant effect on woodland products under this alternative, although up to 186 acres of pinon-juniper forest (or up to 35 acres of ponderosa pine) could be lost due to potential disturbance from mineral exploration and development. This impact would be considered minimal because of the availability of similar resources outside the WSA and low commercial value of woodland resources in the WSA.

LIVESTOCK

Domestic livestock grazing would continue as authorized in the Blue Mountain MFP. The 127 AUMs currently allocated within three allotments are utilized by four livestock permittees. The potential exists for 186 acres to be disturbed by mineral exploration and development. In the short term, this could slightly reduce the number of AUMs available if disturbance were to occur in the form of roads and drill pads throughout the WSA. New livestock facilities (none now planned by BLM) could be proposed in the future and would be allowed without concern for wilderness values. Although the potential for vegetation treatments to increase forage is very low, other facilities possibly could aid in livestock distribution and management.

VISUAL RESOURCES

Visual values in areas affected by the estimated 186 acres of surface disturbance from energy development and livestock management would be negatively impacted. VRM Class II objectives would continue to be implemented for the entire 2,496 acres. Even after rehabilitation, some permanent localized degradation would be expected. If roads, drill pads, and mining developments are located throughout the area (worst-case analysis), visual quality could be significantly reduced in the WSA as a whole. Class II management acreage could receive some long-term degradation of scenic quality, with specific local areas being affected to a significant degree.

CULTURAL RESOURCES

Protection of cultural values would continue as currently provided. There is a potential for 186

acres of surface disturbance by energy and mineral development under this alternative; however, inventories for the purposes of site recordation and mitigation of impacts would take place prior to any surface disturbance. Inadvertent loss or damage could occur in the disturbed areas. The overall effect on cultural resources is unknown. The unknown archaeological sites in the WSA would not have the added protection of wilderness designation.

RECREATION

The entire 2,496 acres (including 2 miles of jeep trails) would remain open to ORV use. Presently, ORV use is limited by the rough terrain.

Primitive recreation values would be foregone in those areas where potential surface-disturbing activities would occur. If roads and drill pads are located throughout the area, primitive recreational opportunities would be lost in the area altogether. Recreational use of the area is low, with hunting and hiking being the most popular. With this alternative, recreation use would largely remain about the same, but could increase slightly each year due to statewide population increases. Based on a review of several projections (Utah Outdoor Recreation Agency, 1980; Utah Office of Planning and Budget, 1984; Jungst, 1978; and Hof and Kaiser, 1981) it is estimated that outdoor recreation in Utah will increase at about 2 percent per year over the next 20 years. At this rate, overall recreation use in the Daniels Canyon WSA is expected to increase from 150 current visitor days per year to about 225 at the end of 20 years.

WILDERNESS VALUES

None of the area would be designated wilderness, and management would be in accordance with the existing Blue Mountain MFP. Expected mineral and energy exploration and development could disturb up to an estimated 186 acres. Naturalness values now existing could be impacted by this disturbance. The related surface disturbance would result in a loss of naturalness and opportunities for primitive and unconfined recreation. Loss of natural values on lands directly impacted could have a negative influence on surrounding areas in the WSA as well.

Opportunities for solitude could be adversely impacted by the sights and sounds of operations within and adjacent to the WSA while operations were ongoing. Hunting is one of the most popular recreation activities and would be highly influenced by impacts to wildlife and their habitat. The archaeological resources are special features that would not receive the added protection of wilderness designation.

LAND USE PLANS AND CONTROLS

The No Action Alternative would not conflict with the *Uintah County Master Plan*, since that plan does not specifically address the Daniels Canyon WSA. This alternative would be consistent with State of Utah plans and policies which emphasize economic return. It would be in conformance with the BLM Blue Mountain MFP.

The surface-disturbing activities potentially associated with this alternative would not be consistent with the "scenic, scientific, cultural, and recreational values that importantly supplement or complement those within the current park boundary" (USDI, NPS 1984a); therefore, this alternative would not be consistent with the NPS recommendation to add the WSA to Dinosaur National Monument.

SOCIOECONOMICS

Without wilderness designation, the Daniels Canyon mineral resources, if they actually exist, could be fully developed. This would be beneficial to both the local and the regional economy. There would be no loss of leasable acreage with possible future economic potential. Oil and gas lease revenues as shown on Table 9 would continue with half of these revenues going to the State. An additional 320 acres could be leased in the future to bring additional income from oil and gas lease Federal revenues estimated at up to \$960 in annual lease fees.

This alternative could result in additional development of energy resources in the Uinta Basin, but it would not contribute substantially to the economies of Vernal and Grand Junction, nor would it result in significant employment for members of the Ute Indian Tribe. The probability of economic development of minerals within the WSA is low.

There would be no livestock-related economic losses because the existing grazing use (127 AUMs) and ability to maintain, replace, and build new range improvements would remain as at present, with about \$2,540 in livestock sales attributed to the forage in the WSA.

As discussed in the Recreation section, recreational use and, therefore, recreation-related local expenditures, could increase at a rate of 2 percent per year over the next 20 years (49-percent increase over 20 years). Because recreational use in the area is estimated to increase by only 75 visitor days per year at the end of 20 years and overall recreation-related expenditures average only \$4.10 per visitor day, the increased recreation-related expenditures of less than \$308 per year at-

tributable to the WSA would likely not be significant to the local economy. Any development of mineral resources in the WSA could possibly reduce the deer population and hunter success. This would reduce the number of hunters and hunter-related expenditures, but the local economic effects still would be insignificant.

All Wilderness Alternative (2,496 Acres)

As identified in the Description of the Alternatives section, the major changes that could occur in the 2,496-acre area would be related to its closure to new mineral leasing, mining claim location, and closure to ORV use.

For the following analysis, it is assumed that the existing post-FLPMA oil and gas leases would expire before production of commercial quantities. Future additional leasing of oil and gas, as well as any other mineral resource leasing, would not be allowed. It is assumed also that no mining claims would be located prior to wilderness designation. Appendix 10 lists surface disturbance assumptions and estimates for the WSA.

Because there is little or no potential for disturbance with the All Wilderness Alternative there would not be impacts from development and surface disturbance. Effects on resources due to changes in management are discussed below.

MINERAL AND ENERGY RESOURCES

Leasable Minerals

Oil and Gas

Designation of the WSA would have limited impact on exploration for oil and gas. Post-FLPMA leases (currently covering 2,176 acres of the WSA) would be subject to wilderness stipulations and 320 acres could not be leased. There are no pre-FLPMA leases with prior and existing rights that would allow for continued exploration and development without wilderness restrictions. It appears unlikely that oil and gas exploration and development would occur on the post-FLPMA leases prior to their expiration. Undiscovered gas resources could not be explored or produced on the 320 acres not leased. Therefore, the estimated 3 million barrels of oil or 18 billion cubic feet of natural gas which is potentially recoverable in this WSA would be foregone with wilderness designation. Considering the low certainty of occurrence, this would not be a significant loss of recoverable oil and gas.

Geothermal

Since no development of this resource is ex-

pected even with the No Action Alternative, wilderness designation would not result in a significant loss of geothermal potential.

Locatable Minerals

Since the area has no existing mining claims and the likelihood for uranium-vanadium is low, significant locatable minerals would not be foregone as a result of wilderness designation.

WILDLIFE

Wildlife would benefit from wilderness designation due to the avoidance of mineral-related surface-disturbing activities on 186 acres as compared to the No Action Alternative.

Impacts relating to this alternative would generally be favorable for wildlife. Wilderness designation would prevent access roads, fence construction, and other forms of man-made intrusions. This would maintain escape cover for deer and other species. This same vegetation would maintain habitat quality for a variety of small birds and mammals inhabiting the area. It would provide a more pristine and solitary environment important to many species. This alternative would reduce hunter access on 2 miles of jeep trails but could slightly improve the overall quality of the hunting experience.

No wildlife management facilities have been proposed for the WSA. Designation would preclude any form of future habitat improvement and/or vegetation conversion projects; however, the loss of this future management option would not be significant, considering the rough terrain and the species present.

LIVESTOCK

Present levels of domestic livestock grazing would continue as authorized in the Blue Mountain MFP. The 127 AUMs currently allocated in the WSA would remain available for livestock.

Existing range improvements would be maintained as in the past, based on practical necessity and reasonableness. New rangeland improvements would be allowed if determined necessary for the purposes of rangeland and/or wilderness protection and the effective management of these resources. Future roads or other livestock handling facilities could be prohibited to protect wilderness values, and the expansion and distribution of livestock use in the area could be limited.

VISUAL RESOURCES

This alternative would maximize preservation of scenic quality, limit landscape modification, and prevent introduction of structures. Visual conditions would meet scenic quality Class A and VRM Class I standards.

CULTURAL RESOURCES

The archaeological sites in the WSA would benefit slightly from the All Wilderness Alternative. Designation would benefit cultural resources by reducing the probability of actions within the WSA that would be disturbing to cultural resources. There is a low potential for increased vandalism to cultural resources due to increased recreational use of the WSA. However, protection afforded by wilderness management would outweigh any potential vandalism problems caused by recreational activities, creating an overall positive impact.

RECREATION

The entire 2,496 acres (including about 2 miles of jeep trails) would be closed to ORV recreational use. This would not be a significant loss of ORV opportunity because this activity is presently very low within the WSA.

Overall, wilderness designation could have a generally positive effect for preserving long-term recreational opportunities.

Primitive recreation values could be enhanced through designation. By increasing public awareness of the area, designation could result in increased primitive recreation use of the WSA. However, judging from the site characteristics of the Daniels Canyon WSA, population distribution about the site, and availability of similar sites, it is possible that primitive recreation use may increase only slightly, primarily associated with increases in the Josie Morris Ranch section of Dinosaur National Monument.

Aside from this association with the National Monument, numerous other areas are available that have recreational opportunities similar to this area. The recreation experience is not outstanding in the WSA by itself.

WILDERNESS VALUES

Application of the "Wilderness Management Policy" would provide the basis for preservation of the identified mandatory wilderness characteristics of naturalness and opportunities for solitude on all 2,496 acres. No areas were identified that contained outstanding opportunities for primitive and unconfined recreation. The special features (primarily archaeological resources) would continue to be protected.

LAND USE PLANS AND CONTROLS

Designation of wilderness for the Daniels Canyon WSA would not conflict directly with any existing land use plan. The Uintah County planning staff stated that it would not conflict with present land use of the area. Due to the low mineral potential of

the WSA, designation would not conflict with Uintah County's goal of encouraging energy and mineral development. Maintaining livestock uses would be consistent with the county plan.

Designation of the Daniels Canyon WSA as wilderness would constitute an amendment of the BLM Blue Mountain MFP. Designation also could result in exchange of State land adjacent to the WSA as discussed in the Description of the Alternatives section and, therefore, would not conflict with State land management objectives.

The All Wilderness Alternative would protect the values identified by the NPS. It is noted that the NPS recommendation (based on H.R. 1214) does not propose adding lands to the National Park System as wilderness but only increases the boundary. In fact, the All Wilderness Alternative would be similar in many respects to NPS land use planning objectives, and a BLM-managed wilderness area in Daniels Canyon would complement the NPS management of the adjacent Dinosaur National Monument.

SOCIOECONOMICS

The Daniels Canyon WSA is potentially favorable for oil and natural gas deposits. Although the likelihood is low, oil and gas developments could take place on post-FLPMA leases if wilderness values were not degraded, but exploration and development in the WSA would be constrained. The probability of a company conducting exploration in a post-FLPMA lease area under wilderness criteria would be reduced with uncertainty of de-

velopment. Therefore, with this alternative, no local jobs or income from oil and gas activities is predicted. Likewise, no local jobs or income from geothermal or uranium-vanadium potentials would occur.

The loss of leasable acreage would cause a loss of Federal and State revenues. The loss of 2,176 acres now under post-FLPMA oil and gas leases could cause an eventual loss of \$6,528 annually to the Federal Treasury, if current leases expired after designation. The loss of 320 acres potentially available for oil and gas leases would cause a potential loss of \$960 annually in future lease fee payments to the Federal Treasury. In each case, the State of Utah would have received half of these revenues. No royalty payments from these foregone leases would be received.

Livestock use in the WSA is estimated at 127 AUMs of forage consumed annually. Income from sales and the return of the ranchers' labor and investment total an estimated \$2,540 annually. With designation, current livestock use would be expected to continue but not increase. New rangeland improvements would be allowed only if they were primarily for the purposes of rangeland and/or wilderness resource protection and management. Wilderness designation could place greater restrictions on operations within the WSA; however, increased costs would not be significant. Any increase in recreational use in the Daniels Canyon WSA would be small and would not result in significant local income. The amount of such increases and related income is unknown.

BIBLIOGRAPHY

- Behle, William H. 1975. *Birds of Northeastern Utah*. p.46.
- Campbell, Jack A. and Ritzma, Howard R. 1979. *Geology and Petroleum Resources of the Major Oil-Impregnated Sandstone Deposits of Utah*. August 1979. Utah Geological and Mineral Survey, Salt Lake City, Utah.
- Dalton, Michael J. 1982. *Outdoor Recreation in Utah: The Economic Significance*. Institute of Outdoor Recreation and Tourism, College of Natural Resources, Utah State University, Logan, Utah. pp. 25-27.
- Eighty-Eighth Congress of the United States. 1964. *Wilderness Act*. Public Law 88-577. September 3, 1964. U.S. Government Printing Office, Washington, D.C.
- Federal Emergency Management Agency. 1983. *Stockpile Report to the Congress*. September 1983. U.S. Government Printing Office, Washington, D.C.
- Foster, Robert H. 1968. "Distribution of the Major Plant Communities in Utah." May 1968. Brigham Young University, Provo, Utah. 125 pp.
- Hof, John and Kaiser, F. 1981. "Long-Term Recreation Participation Projections for Public Land Management Agencies" (unpublished document). May 15, 1981. U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Jungst, Steven. 1978. *Projecting Future Use of the National Forest Wilderness System*. Cooperative Agreement 13-522 prepared for the U.S. Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Ft. Collins, Colorado.
- Leifeste, B. 1978. "Pacific Southwest Inter-Agency Committee (PSIAC) Methodology for Estimating Sediment Yield on Semiarid Watersheds and Relationship to Bureau Inventory Data Base." *Nevada-Utah Fiscal Year 1979 Watershed Workshop*. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.
- National Oceanic Atmospheric Administration. 1979. *Thermal Spring List for the United States*. U.S. Government Printing Office, Washington, D.C.
- Nicholson, Bob. 1982. "Planning Office Views on Daniels Canyon Wilderness Study Area," (personal communication). November 1982. Uintah County Commission, Vernal, Utah.
- Petroleum Investment Company. 1981. *Oil and Gas Map of Eastern Utah Showing Tectonics and Regional Geology*. Salt Lake City, Utah.
- Ritzma, H. R. 1972. *Uinta Basin Geology Atlas of the Rocky Mountain Region*. Rocky Mountain Association of Geologists, Denver, Colorado. pp. 276-277.
- Science Applications, Inc. 1982. *Mineral Resource Evaluation of Wilderness Study Areas Administered by The Bureau of Land Management, The Vernal District, Utah*. October 1, 1982. Oak Ridge, Tennessee. 337 pp.
- Thornbury, William D. 1965. *Regional Geomorphology of the United States*. John Wiley and Sons, Inc., New York, London, Sydney. 428 pp.
- U.S. Department of Agriculture, Soil Conservation Service. 1978. "Utah Rangeland and Forest Land" (unpublished document). Salt Lake City, Utah.
- U.S. Department of Commerce, Bureau of the Census. 1981. *1980 Census of Population and Housing*. Publication No. PHC 80-V-46. March 1981. Bureau of the Census, Washington, D.C.
- U.S. Department of Commerce, Bureau of the Census. 1983. *General Social and Economic Characteristics, Utah, 1980 Census of Population*. June 1983. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of Commerce, Bureau of Economic Analysis. 1983. *Regional Economic Information System, Employment by Type and Broad Industrial Sources, 1976-1980*. April 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1974a. "Blue Mountain Planning Unit, Unit Resource Analysis" (unpublished document). Book Cliffs Resource Area, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1974b. "Blue Mountain Management Framework Plan" (unpublished document). Vernal District, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1980. *BLM Intensive Wilderness Inventory: Final Decision*. November 1980. Utah State Office, Salt Lake City, Utah. 404 pp.
- U.S. Department of the Interior, Bureau of Land Management. 1981. "Wilderness Manage-

- ment Policy." *Federal Register* Notice. September 24, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1982. "Wilderness Study Policy: Policies, Criteria, and Guidelines for Conducting Wilderness Studies on the Public Lands." *Federal Register* Notice. Volume 47, No. 23. February 3, 1982. U.S. Government Printing Office, Washington, D.C.
- U.S. Department of the Interior, Bureau of Land Management. 1983. *Final Environmental Impact Statement on the Uinta Basin Synfuels Development*. February 1983. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984a. *Scoping the Utah Statewide Wilderness Environmental Impact Statement: Public Scoping Issues and Alternatives*. July 10, 1984. U.S. Government Printing Office, Denver, Colorado.
- U.S. Department of the Interior, Bureau of Land Management. 1984b. *Mineral Plats*. Vernal District Office, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Land Management. 1985. "Water Filings" (unpublished document). Vernal District Office, Vernal, Utah.
- U.S. Department of the Interior, Bureau of Reclamation. 1975. *Salinity and Sediment Study, Upper Colorado River Basin, Utah, Colorado, Wyoming*. June 1975. Salt Lake City, Utah.
- U.S. Department of the Interior, National Park Service. 1984a. *Preliminary Resource Assessment for Wilderness Study Areas contained in H.R. 1214*. July 1984. Rocky Mountain Regional Office, Denver, Colorado.
- U.S. Department of the Interior, National Park Service. 1984b. *Resource Assessment for Daniels Canyon Wilderness Study Area*. July 1984. Rocky Mountain Regional Office, Denver, Colorado.
- U.S. Department of the Interior, Geological Survey. 1978. *Ecosystems of the United States (Map)*. Reston, Virginia.
- U.S. Secretary of the Interior. 1985. "Suitability of Daniels Canyon Area for Inclusion into the National Park System" (personal communication). February 6, 1985. U.S. Department of the Interior, Washington, D.C.
- Utah Department of Employment Security. 1980. "Selected 'Annual Reports' (1970-1980)" (unpublished document). Salt Lake City, Utah.
- Utah Department of Employment Security. 1983. "Social Economics Information" (unpublished document). Salt Lake City, Utah.
- Utah Office of Planning and Budget. 1984. *Utah Baseline Provisional Population Projections 1983-2000*. April 1984. Salt Lake City, Utah.
- Utah Outdoor Recreation Agency. 1980. *Utah Outdoor Recreation Plan, 1980 SCORP*. Salt Lake City, Utah. p. 157.
- Welsh. 1979. *Illustrated Manual of Proposed Endangered and Threatened Plants of Utah*. U.S. Department of the Interior, Fish and Wildlife Service, Bureau of Land Management, and U.S. Department of Agriculture, Forest Service. Government Printing Office, Washington, D.C. 317 pp.

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

Form 1279-3
(June 1984)

BORROWER

QH 76.5 .U8 U82
Utah BLM State
Wilderness env

DATE
LOANED

BORROWER

BLM Library
D-553A, Building 50
Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047

